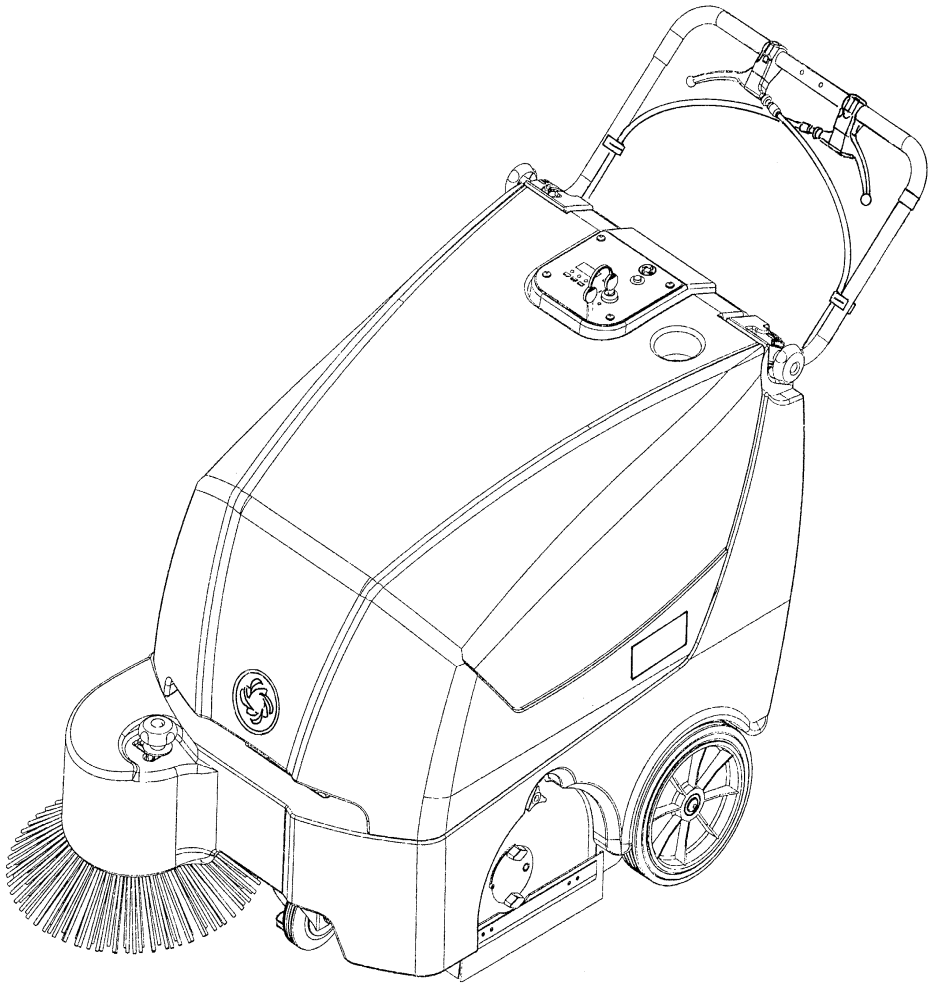
Terra 128B - 132B



SERVICE MANUAL

Advance

146 0721 000(2)2003-04

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In this manual, all the references to front part, R.H. side, L.H. side or rear part have to be intended with the operator on the driving seat.

MACHINE LIFTING

WARNING!
Do not work under the lifted machine, if it is not securely fixed.

MACHINE TRANSPORTATION

WARNING!
Before transporting the machine, ensure that:

- **All doors, drawers and carters are closed**
- **The ignition key is not inserted**
- **The machine is fastened to the mean of transportation**

OTHER AVAILABLE MANUALS

The following manuals are available by Advance Literature Service Department:

– Terra 128B - Spare Part List - Advance Form Number 146 0597 000
– Terra 128B - Use and Maintenance Manual - Advance Form Number 146 0596 000
– Terra 132B - Spare Part List - Advance Form Number 146 0788 000
– Terra 132B - Use and Maintenance Manual - Advance Form Number 146 0791 000

GENERAL INFORMATION

SAFETY - ACCIDENT PREVENTION

The following symbols indicate potentially dangerous situations. Always read carefully this information and take the necessary precautions to protect people and objects.

DANGER!
Indicates a dangerous situation (risk of death) for the User.

WARNING!
Indicates the risk of being injured.

CAUTION!
Indicates a caution or a remark related to important or useful functions. Take care of the paragraphs marked by this symbol.

GENERAL SAFETY RULES

Specific warnings and cautions to inform about potential damages to people and machine are shown below.

DANGER!

- **To perform maintenance/repair procedures turn the machine ignition key to OFF position and disconnect the battery.**
- **This machine must be used by qualified and authorized personnel only. Children or disabled people cannot use this machine.**
- **Keep the battery far from sparks, flames and smoke. During the normal operation explosive gases are delivered.**
- **Do not wear jewels when working near electrical components.**
- **Do not work under the lifted machine, if it is not securely fixed.**
- **Do not operate the machine near dangerous, inflammable and/or explosive powders, liquids or vapors.**
- **Battery charging produces explosive hydrogen gas. Keep the hood open during battery charging and perform the operation only in well-ventilated areas and far from naked flames.**

WARNING!

- **Carefully read all maintenance/repair instructions before performing any maintenance/repair procedure.**
- **Take all necessary precautions to prevent hair, jewels and loose clothes from being caught by the machine moving parts.**
- **Do not smoke during battery charging.**
- **Do not leave the machine unattended with the ignition key inserted and the parking brake deactivated.**
- **Do not use the machine on surfaces with a gradient greater than the one indicated on the machine.**
- **Do not wash the machine with pressurized water or corrosive substances. Do not use compressed air to clean this type of machine.**
- **Do not use the machine in too dusty areas.**
- **While using this machine take care not to cause damage to people.**
- **Storage temperature must be within +32°F - +104°F (0°C - +40°C).**
- **The machine working temperature must be within +32°F - +104°F (0°C - +40°C).**
- **Humidity range should be within 30% and 95%.**
- **Do not use the machine as a transport vehicle.**
- **Do not allow the brushes to operate while the machine is stationary to avoid damaging the floor.**
- **In case of fire, use a powder extinguisher. Do not use water.**
- **Do not remove or modify the plates affixed on the machine.**
- **If parts must be replaced, require ORIGINAL spare parts from a Dealer or Authorized Retailer.**
- **The machine must be disposed of properly, because of the presence of toxic-harmful materials (battery acid, oil, etc.), which are subject to standards that require disposal in special centers (see the related chapter in the Use and Maintenance Manual).**
- **When lead batteries (WET) are installed on this machine, do not tilt the machine more than 30° from its horizontal position to not allow the highly corrosive acid to leak out of the batteries. When it is necessary to tilt the machine for maintenance, remove the batteries.**

TECHNICAL DATA

Dimensions	**Terra 128B**	**Terra 132B**
Cleaning width (with side brush)	700 mm (27.6 in)	820 mm (32.3 in)
Minimum machine length	1070 mm (42.13 in)	
Machine width, without side brush	667 mm (26.26 in)	773 mm (30.4 in)
Height when the handlebar is lowered	836 mm (32.91 in)	
Minimum height from ground	40 mm (1.6 in)	
Handlebar height, minimum/maximum	824 /1120 mm (32.4 / 44 in)	
Main brush size	Ø 245 mm x 500 mm (9.65 x 19.69 in)	Ø 245 mm x 600 mm (9.65 x 23.62 in)
Side brush size	Ø 347 mm (13.7 in)	
Speed with maximum push force	4,24 Km/h (2.63 mph)	4,38 Km/h (2.74 mph)
Maximum slope	2 %	
Hopper capacity	40 Lt (1.4 ft^3)	50 Lt (1.7 ft^3)
Machine total weight	94,78 Kg (210.62 lb)	100,9 Kg (222.4 lb)
Front wheel, steering	Ø 125/37.5-50 mm (4.92/1.48-1.97 in)	

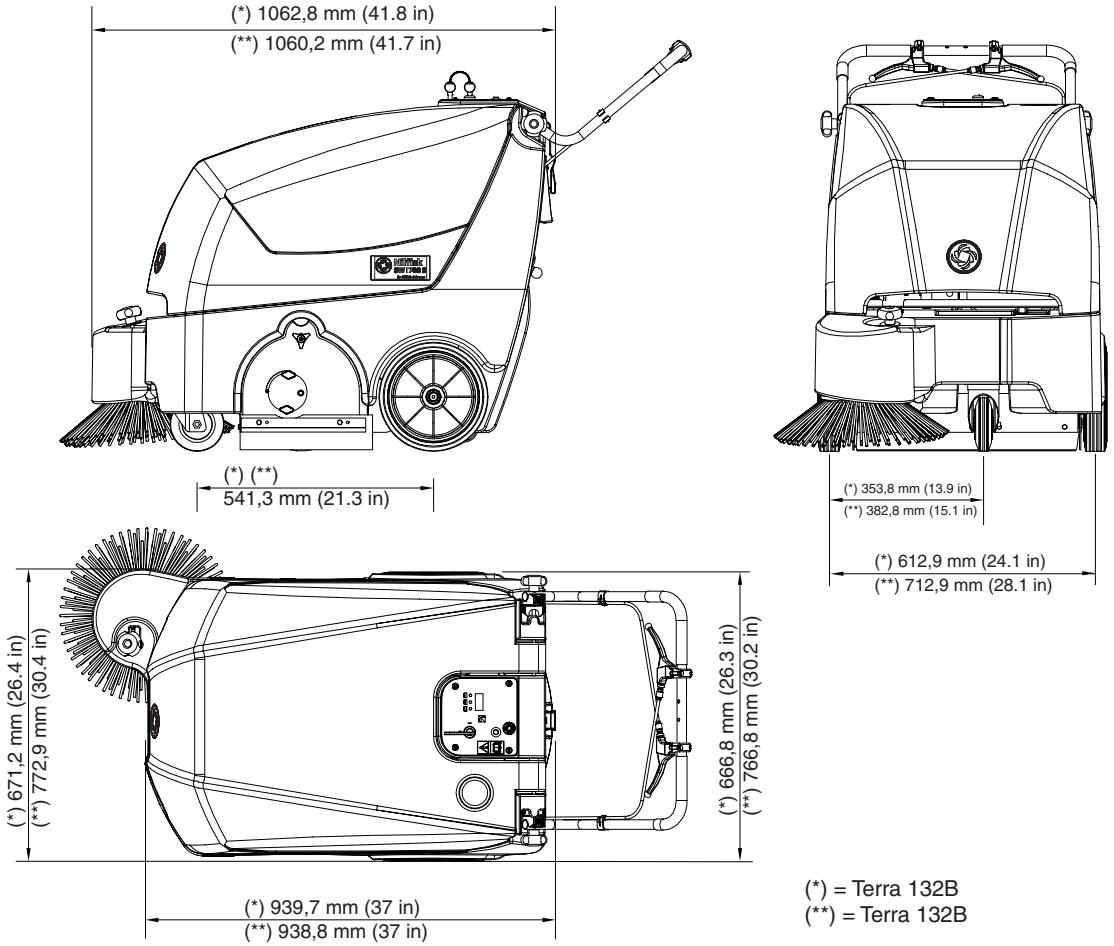
Continues

GENERAL INFORMATION

Rear wheels, driving	Ø 250 x 50 mm (Ø 9.84 x 1.97 in)
Main electric motor	600 W - 3000 RPM
Sound level (Lpa)	64 dB (A)
Electric filter-shaker (optional)	12 V, 30 W

Batteries	**Terra 128B**	**Terra 132B**
Standard battery	Lead, with acid electrolyte (WET)	
Optional battery	Gel, hermetic (GEL)	
Battery voltage	12 V	
Battery compartment max. size	398x262x283 (15.7x10.3x11.1 in)	

Dust suction and filtering	**Terra 128B**	**Terra 132B**
Paper dust filter 5-10 µm	2 m^2 (22 ft^2)	
Electric filter-shaker (optional)	12V, 30 W	
Vacuum in main brush compartment	4 mm H_2O (0.63 in H_2O)	



S300366

MAINTENANCE

SCHEDULED MAINTENANCE

The machine proper and safe operation is granted by a careful and constant maintenance.

See GENERAL INFORMATION and SAFETY - ACCIDENT PREVENTION

The following table sums up the scheduled maintenance. The indicated periods can be subjected to variations according to working conditions. These must be defined by the person in charge of maintenance.
For maintenance operation instructions see the following paragraphs.

SCHEDULED MAINTENANCE TABLE

Maintenance operation	On delivery	Every 10 hours	Every 50 hours	Every 100 hours	Every 200 hours	Every 400 hours
Battery liquid level check	●	● (1)				
Driving belt visual inspection: traction, main brush	●			●		
Flap height and operation check	●		●			
Side and main brush height check		●				
Dust pre-filter cleaning and integrity check		● (1)				
Filter-shaker operation check			●			
Nut and screw tightening check				●		
Drive belt check and tensor adjustment			●			
Driving belt replacement: traction, main brush					●	
Main electric motor brush (or carbon brush) check or replacement						●
Hood opening switch operation check			●			
Check if the machine does not start when the (optional) battery charger plug is connected to the net outlet.			●			

(1): Or before each start.

GENERAL INFORMATION

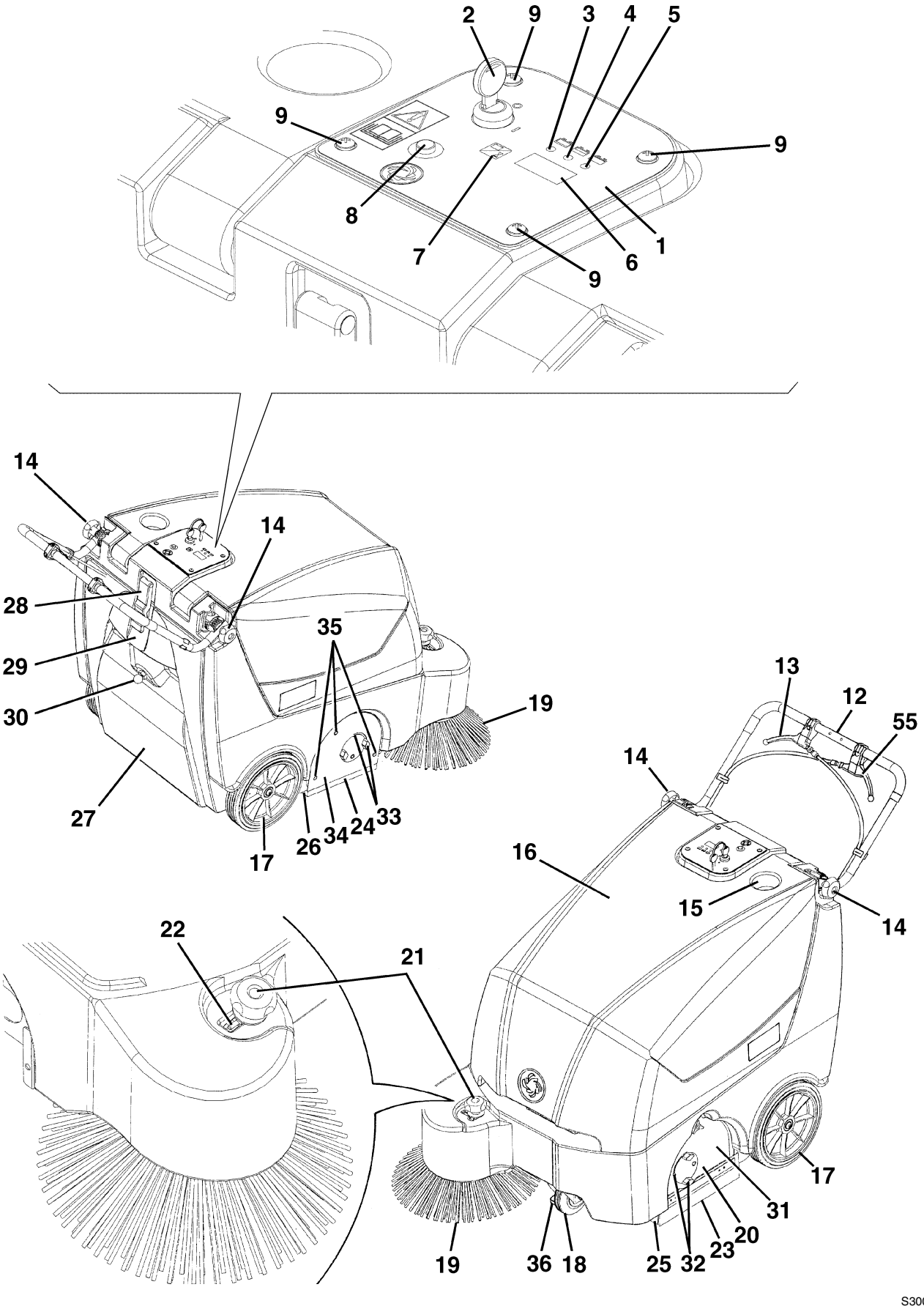
MACHINE NOMENCLATURE

In this Manual you find numbers in brackets – example: (2). These numbers refer to the components indicated in these two nomenclature pages. Refer to these pages each time you want to find the component mentioned in the text.

1. Control panel
2. Ignition key
3. Discharged battery warning light
4. Semi-discharged battery warning light
5. Charged battery warning light
6. Display
7. Display selection button: hour counter/ hour and minutes counter / battery voltage (V),
8. Filter-shaker button (optional)
9. Panel fastening screws
10. Serial number plate / technical data / EC certification
11. Machine serial number
12. Handlebar
13. Selector lever
14. Handlebar inclination adjusting knobs
15. Can holder
16. Hood
17. Rear wheels on fixed axis
18. Pivoting front wheel
19. Side brush
20. Main brush (inside)
21. Side brush lifting and adjusting knob
22. Side brush retainer
23. Lift side flap
24. Right side flap
25. Front flap
26. Rear flap
27. Hopper
28. Hopper hook
29. Hopper hook handle
30. Manual filter-shaker handle
31. Main brush movable door
32. Main brush height left adjuster
33. Main brush height right adjuster
34. Main brush right door
35. Main brush right door fastening screws
36. Pedal brake on front wheel (optional)
37. Batteries
38. Battery connector
39. Battery charger
40. Battery charger electrical cable
41. Main fuse
42. Side brush motor fuse
43. (Lead) battery caps
44. Lead (WET) or gel (GEL) battery selector switch positioned on the electronic battery charger
45. Battery assembly diagram
46. Charged battery warning light
47. Main brush belt
48. Drive belt
49. Drive pulley to main brush
50. Drive pulley to traction
51. Fan
52. Main electric motor
53. Hood safety switch
54. Battery charger electrical connector (brown) (prearrangement)
55. Front flap lifting lever (*)
56. Ground discharge chain
57. Key fuse

(*) Only on Terra 132B

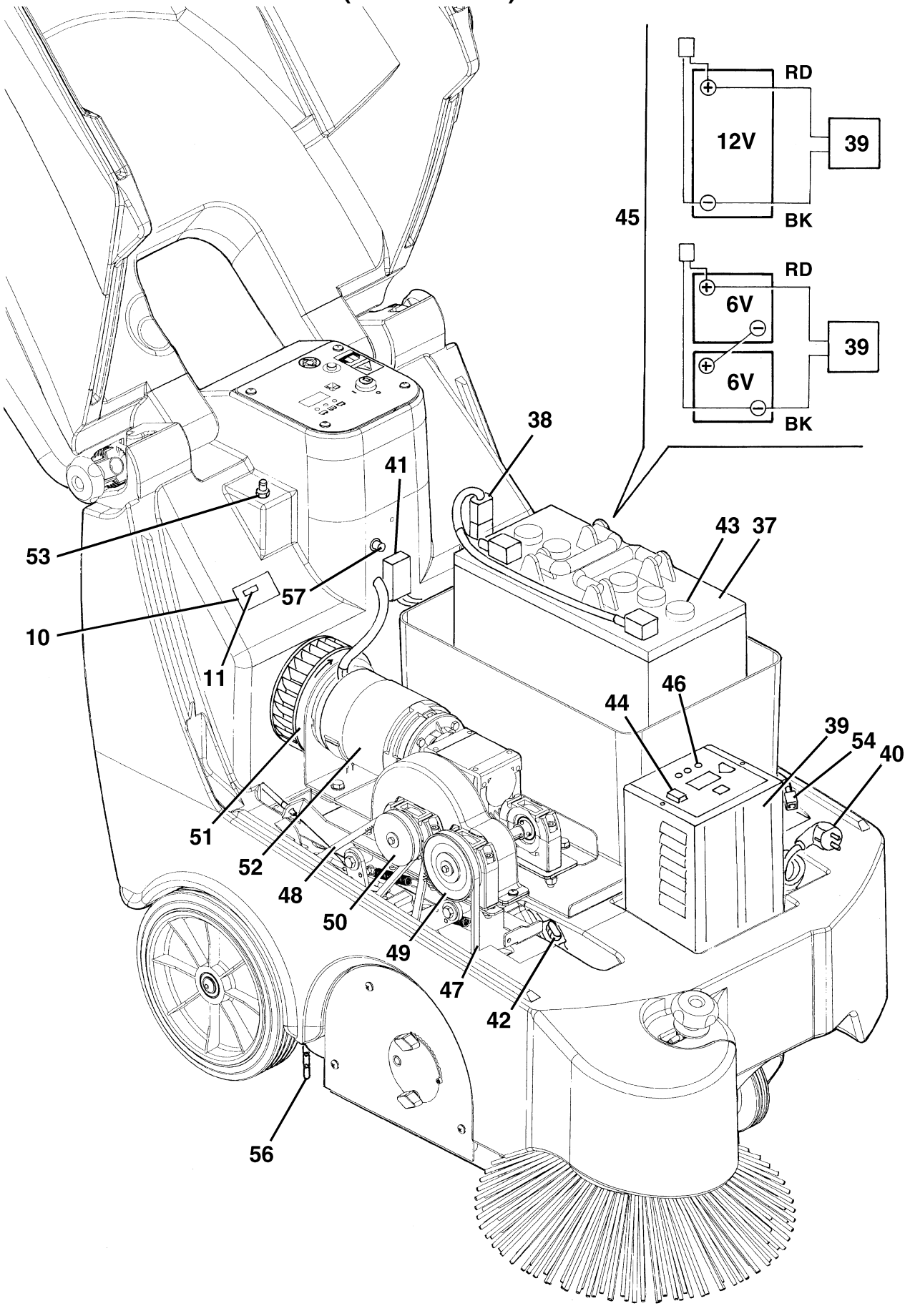
MACHINE NOMENCLATURE (CONTINUES)



S300367

GENERAL INFORMATION

MACHINE NOMENCLATURE (CONTINUES)



S300368

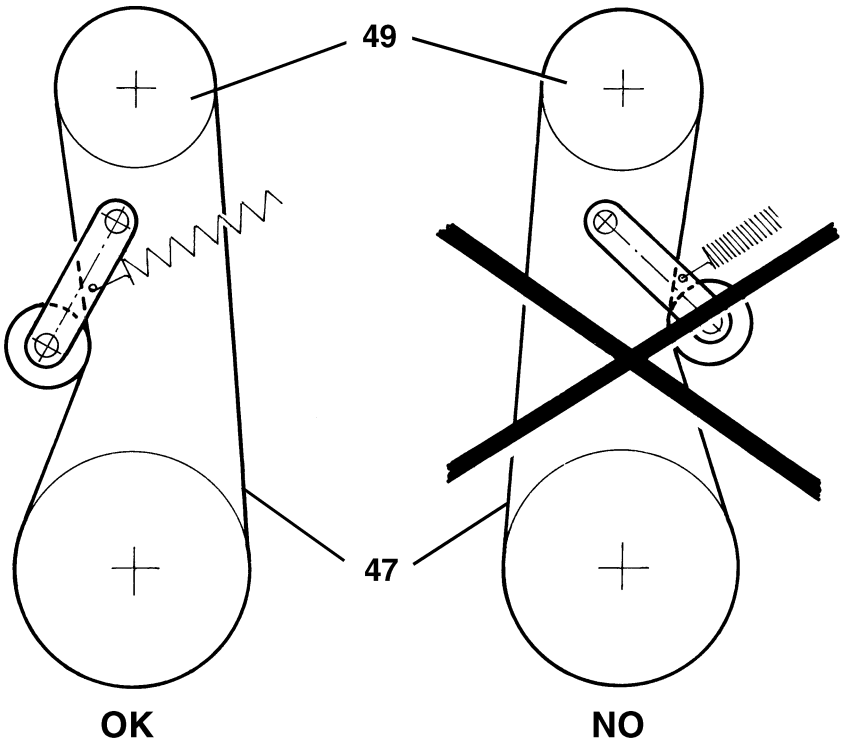
VISUAL INSPECTION OF THE BELT FROM THE ENGINE TO THE MAIN BRUSH

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Open the hood (16).
4. Visually inspect the timing belt (47) condition from the engine to the main brush. To check the belt completely, rotate is by operating manually on the fan (51).
5. If the timing belt is worn, replace it performing the following procedure.
6. Carry out steps from 1. to 3. in the reverse order.

BELT REPLACEMENT FROM THE ENGINE TO THE MAIN BRUSH

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Remove the main brush (see the procedure in the related paragraph).
4. Remove the belt (47) from the pulley (49). To facilitate the operation, rotate the pulley (49) by manually operating on the fan (51).
5. Remove the screws (35) and the right door (34) together with the belt (47).
6. Install in the reverse order of removal, with the following change:
   – Set the belt tensioner (47) as shown in the figure below.

Figure 1



S300412

SWEEPING SYSTEM

MAIN BRUSH HEIGHT ADJUSTMENT

Remark: Brushes with harder or softer bristles are available. This procedure is applicable to each type of brushes.

Check

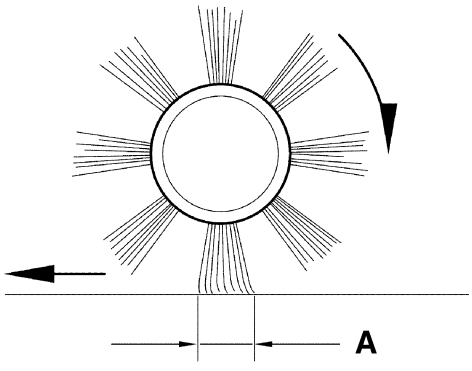
1. Check the main brush correct height from the ground, proceeding as follows:
   – Drive the machine on a level ground.
   – Keep the machine stationary and rotate the main brush for a few seconds.
   – Stop the main brush and move the machine.
   – Check that the main brush print (A), along is width, is from 0.8 to 1.6 in (2 to 4 cm).
   In case the print (A) is not within the specifications, it is necessary to adjust the brush height, proceeding as follows.

CAUTION!
If the main brush print is excessive (above 1,6 in [4 cm]), the machine regular operation is affected and the moving or electrical parts can overheat, thus reducing machine life.
Take care when performing the above-mentioned checks and use the machine only according to the indicated conditions.

Adjustment

2. Drive the machine on a level ground and activate the pedal brake (36), if present.
3. Turn the ignition key (2) to “0” position.
4. Loosen the knobs (B) on both side of the machine.
5. Operating on the knobs (B) move, on both sides of the machine, the brush height variation indicator (C) as necessary and then screw down the knobs (B).
   The index (C) must be set to the same position on both machine sides.
6. Perform step 1 again to check the proper adjustment of the main brush height from the ground.
7. When the main brush is too worn out the adjustment is no more possible; replace the brush following the instructions on the following page.

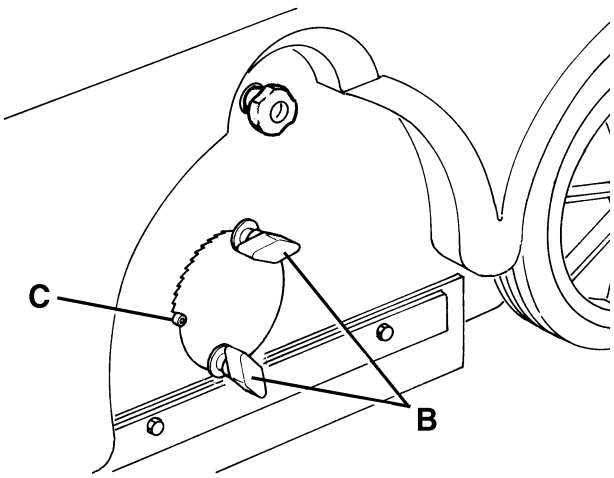
Figure 1



0.8 ÷ 1.6 inch
2 ÷ 4 cm

S300228

Figure 2



S300229

MAIN BRUSH REPLACEMENT

Remark: Brushes with harder or softer bristles are available. This procedure is applicable to each type of brushes.

CAUTION!
It is advisable to use protective gloves when replacing the main brush because there can be cutting debris between the bristles.

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Loosen the knobs (A) on both side of the machine.
4. Move the brush height variation indicators (B) until the brush reaches the maximum distance from the ground. Screw down the knobs (A).
5. Open the hood (16).
6. On the left side of the machine, loosen the knob (C).
7. Remove the brush cover (D) pressing downward to disengage the retainers (E).
8. Pull out the brush (F).
9. Check that the drive hub (I) is free from dirt or foreign materials (cords, clothes, etc.) accidentally rolled up.
10. The new brush must be installed with the bristles rows (G) bended as shown in the figure (top view).
11. Install the new brush on the machine and ensure that its flange (H) correctly fits on the related drive hub (I).
12. Reinstall the brush cover (D), engaging the retainers (E).
13. Screw down the knob (C).
14. Carry out the Main Brush Height Adjustment as described on the previous page.

Figure 3

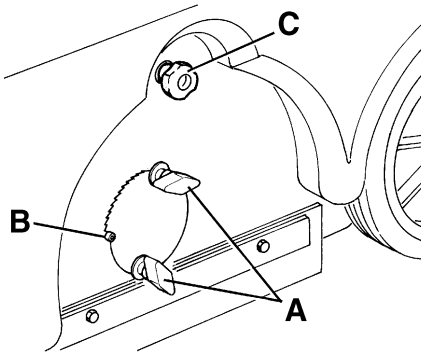


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Figure 4

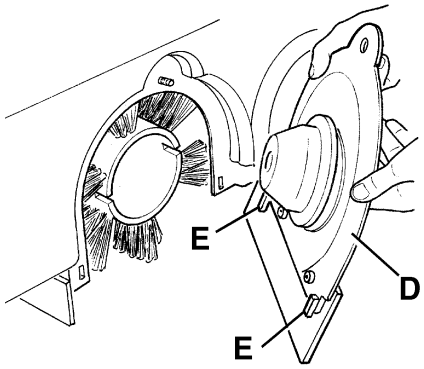

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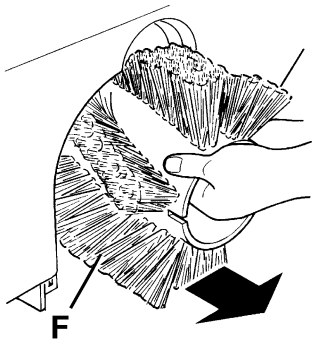
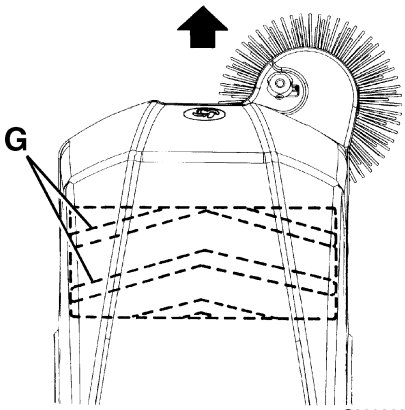
Figure 5



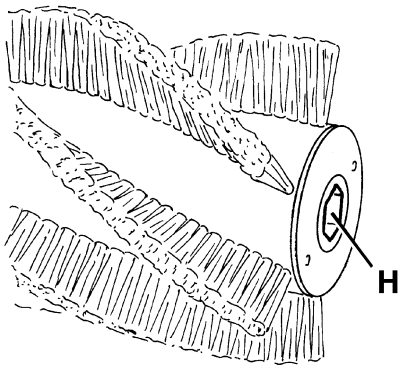
S300232

Figure 6



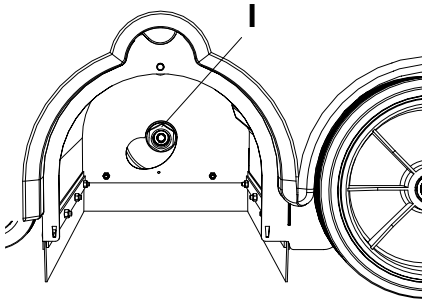
S300369

Figure 7



S300234

Figure 8



S300235

SWEEPING SYSTEM

SIDE BRUSH HEIGHT ADJUSTMENT

Remark: Brushes with harder or softer bristles are available. This procedure is applicable to each type of brushes.

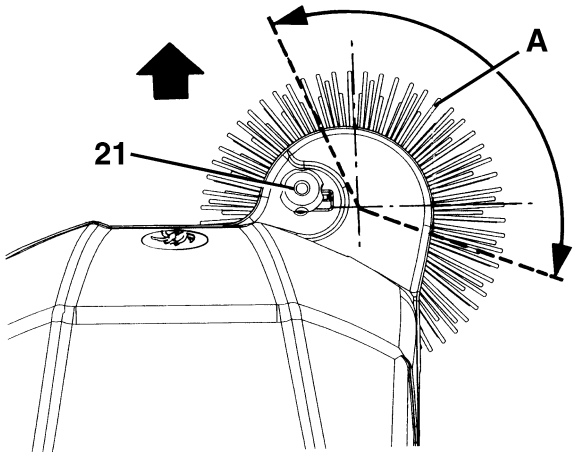
Check

1. Check the side brush correct height from the ground, proceeding as follows:
   – Drive the machine on a level ground and lower the side brush.
   – Keep the machine stationary and rotate the side brush for few seconds.
   – Stop the side brush and move the machine.
   – Check that the side brush print (A) is, in extension and orientation, as shown in the figure. In case the print is not within the specifications, it is necessary to adjust the brush height, proceeding as described in step 2.

Adjustment

2. Rotate the handle (21) clockwise or counter-clockwise to adjust the brush height from ground.
3. Perform step 1 again to check the proper adjustment of the side brush height from the ground.
4. When the brush is too worn out and the adjustment is no more possible, replace the brush following the instructions in the following paragraph.

Figure 9



S300413

SIDE BRUSH REPLACEMENT

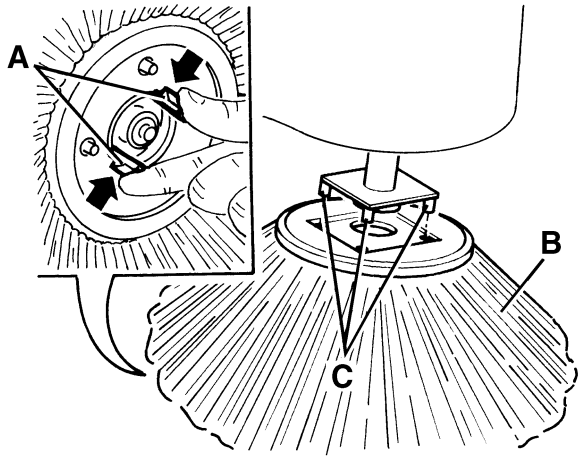
Remark: Brushes with harder or softer bristles are available. This procedure is applicable to each type of brushes.

CAUTION!

It is advisable to use protective gloves when replacing the side brush because there can be cutting debris between the bristles.

1. Turn the ignition key (2) to “0” position.
2. Insert the hand inside the side brush and press the tabs (A) inward and then remove the brush (B) disengaging it from the four pins (C).
3. Install the new brush on the machine engaging it on the pins (C) and on the tabs (A).
4. Carry out the Side Brush Height Adjustment as described above.

Figure 10



S300237

SWEEPING SYSTEM

MAIN MOTOR ELECTRICAL INPUT CHECK

WARNING!

This procedure must be performed by qualified personnel only.

Discharged motor electrical input check

1. Remove the main brush (see the procedure in the related paragraph).
2. Open the hood (16).

WARNING!

Carry out the following operation with extreme care.

3. Set an ammeter (A) on the battery positive cable (B).
4. Remove the side brush motor fuse (42).
5. Press and hold the hood safety switch (53), turn the ignition key to (2) “I” position, without pulling the selector lever (13) and then check that the main motor electrical input is:
   – Max. 50 A at 12 V, with cold engine
   – Max. 45 A at 12 V, with hot engine

   If the electrical input is higher, perform the following operations to detect and correct the causes:
   – Remove any dirt or foreign materials from the transmission system, which can possibly hinder or slow down regular movements.
   – If necessary, carry out the motor brush check (see the procedure on the following pages).
   – If necessary, disassemble the suction motor (see the procedure in the related paragraph), clean it and check its moving parts.

   If the above-mentioned procedures do not lead to a correct electrical input, it is necessary to replace the motor (see the procedure on the following page).
6. Carry out steps from 1. to 4. in the reverse order.
7. If the electrical input with the engine discharged is correct, it is necessary to carry out the charged motor electrical input check, according to the following procedure.

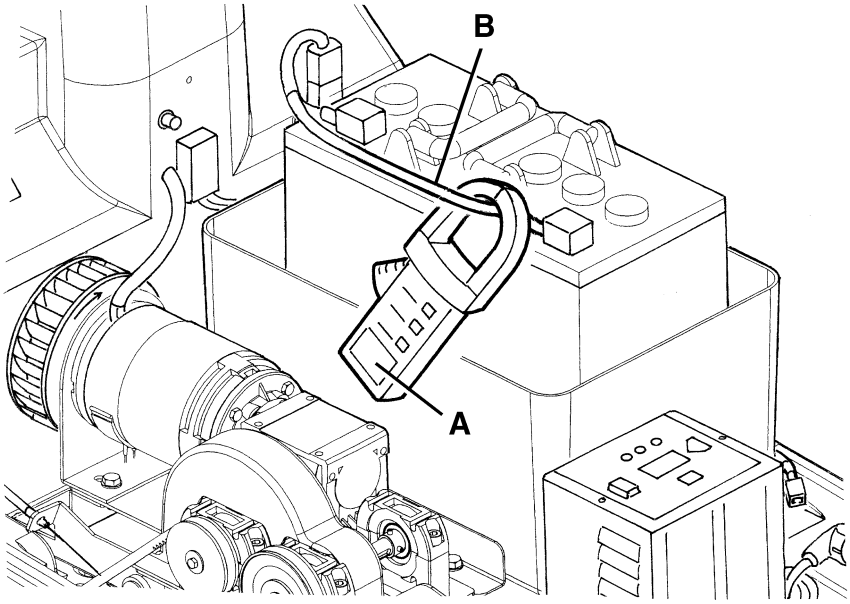
Charged motor electrical input check

8. Reinstall the main brush (see the procedure in the related paragraph).
9. Check that the main brush height adjustment is correct (see the procedure in the related paragraph).
10. Warm up the main electric motor by operating the machine for at least ten minutes.
11. Open the hood (16).

WARNING!
Carry out the following operation with extreme care.

12. Set an ammeter (A) on the battery positive cable (B).
13. Remove the side brush motor fuse (42).
14. Press and hold the hood safety switch (53), turn the ignition key to (2) “I” position, without pulling the selector lever (13) and then check that the main motor electrical input is max. 55 A at 12 V.
15. If the electrical input is higher, check that the main brush height adjustment is correct (see the procedure in the related paragraph) and then carry out steps from 10 to 14 again.
16. Carry out steps from 11. to 13. in the reverse order.

Figure 11



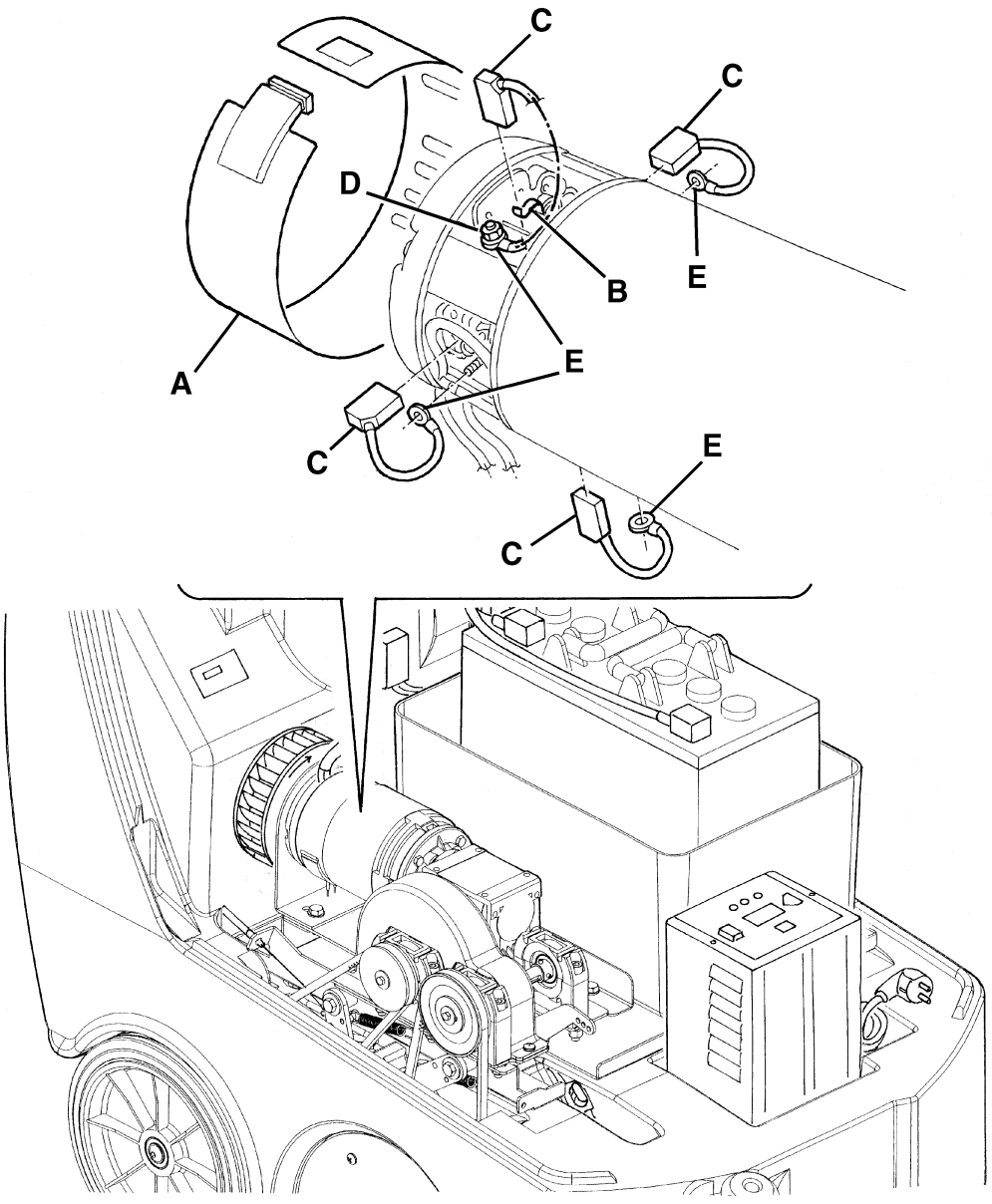
S300371

SWEEPING SYSTEM

MAIN MOTOR BRUSH/CARBON BRUSH CHECK AND REPLACEMENT

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Open the hood (16).
4. Disconnect the battery electrical connector (38) and remove the batteries (37) and the related holder.
5. Remove dust and dirt from the motor exterior part; then disengage and remove the clamp (A).
6. For each of the four brushes, lift the retaining spring (B) and remove the brushes (C).
7. Check if the four brushes are worn. The brushes are worn when there is not sufficient contact with the motor armature, because of their use, of the contact surface which is not integral or because the thrust spring is broken, etc.
8. If necessary, remove the brushes to replace them, by unscrewing the nuts (D) and disengaging the lead-in wires (E).
9. It is advisable to replace all the brushes at the same time.
10. Install in the reverse order of removal, with the following caution:
    – When connecting the terminals (E), take care of their insulation from the surrounding parts of the frame.

Figure 12



S300272

MAIN BRUSH AND REDUCTION UNIT REPLACEMENT

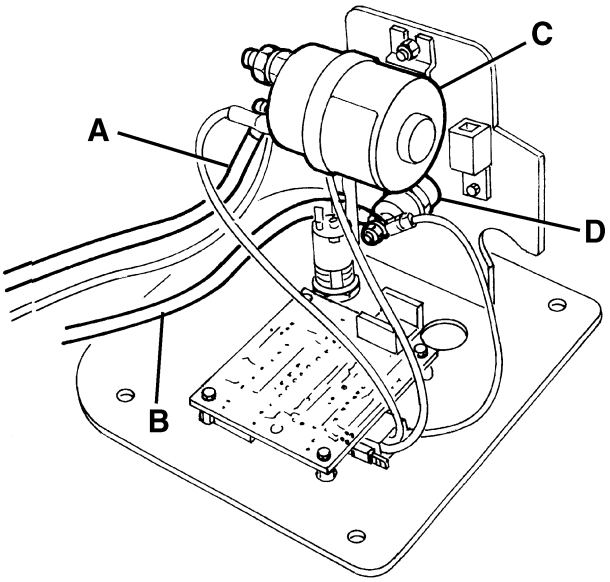
Removal

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Open the hood (16).
4. Disconnect the battery electrical connector (38).
5. Remove the belt (47) from the pulley (49). To facilitate the operation, rotate the pulley (49) by manually operating on the fan (51).
6. Remove the belt (48) from the pulley (50).
7. Remove the screws (9) and lift the control panel (1).
8. Disconnect the main brush cables, (A) "red" and (B) "black", from the electromagnetic switch (C) and from the insulator (D) respectively.
9. Remove the internal retaining clamp (F) and then remove the main motor electrical cable (E) from the frame.
10. Unscrew the seven screws (G) and remove the reduction unit assembly (H).

Disassembly at the cabinet bench

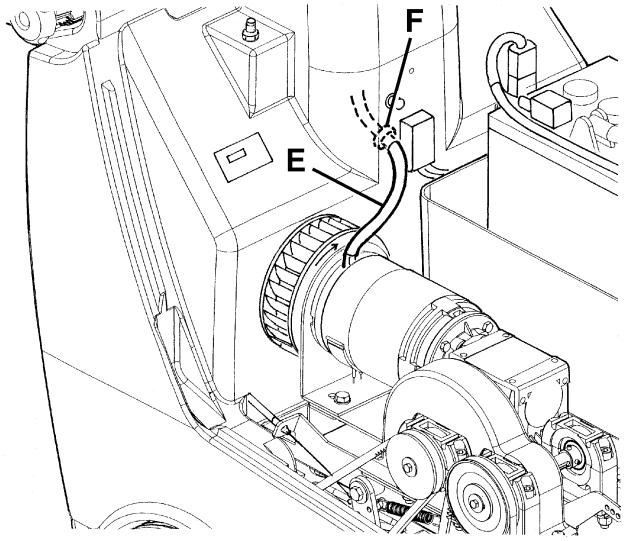
11. Remove the screws (L) and the carter (M) at the cabinet bench.
12. Remove the screws (K) and shaft with ring gear and pulley (N, O, P) assembly.
13. Unscrew the screws (Q) and remove the electric motor, reduction unit, ring gear and pulley (R, S, T, U).
14. Unscrew the screw (V) and pull out the shaft with ring gear and pulley (W, T, U).
15. Remove the screws (X) and the reduction unit (S).
16. Loosen the dowel (Y) and remove the screw (Z).
17. Pull out the fan (AA) and recover the key (AB).
18. Remove the screw and the bracket (AC) with the motor.
19. Remove the screws (AD) and the main electric motor (R).
20. Install in the reverse order of removal.

Figure 13



S300240

Figure 14

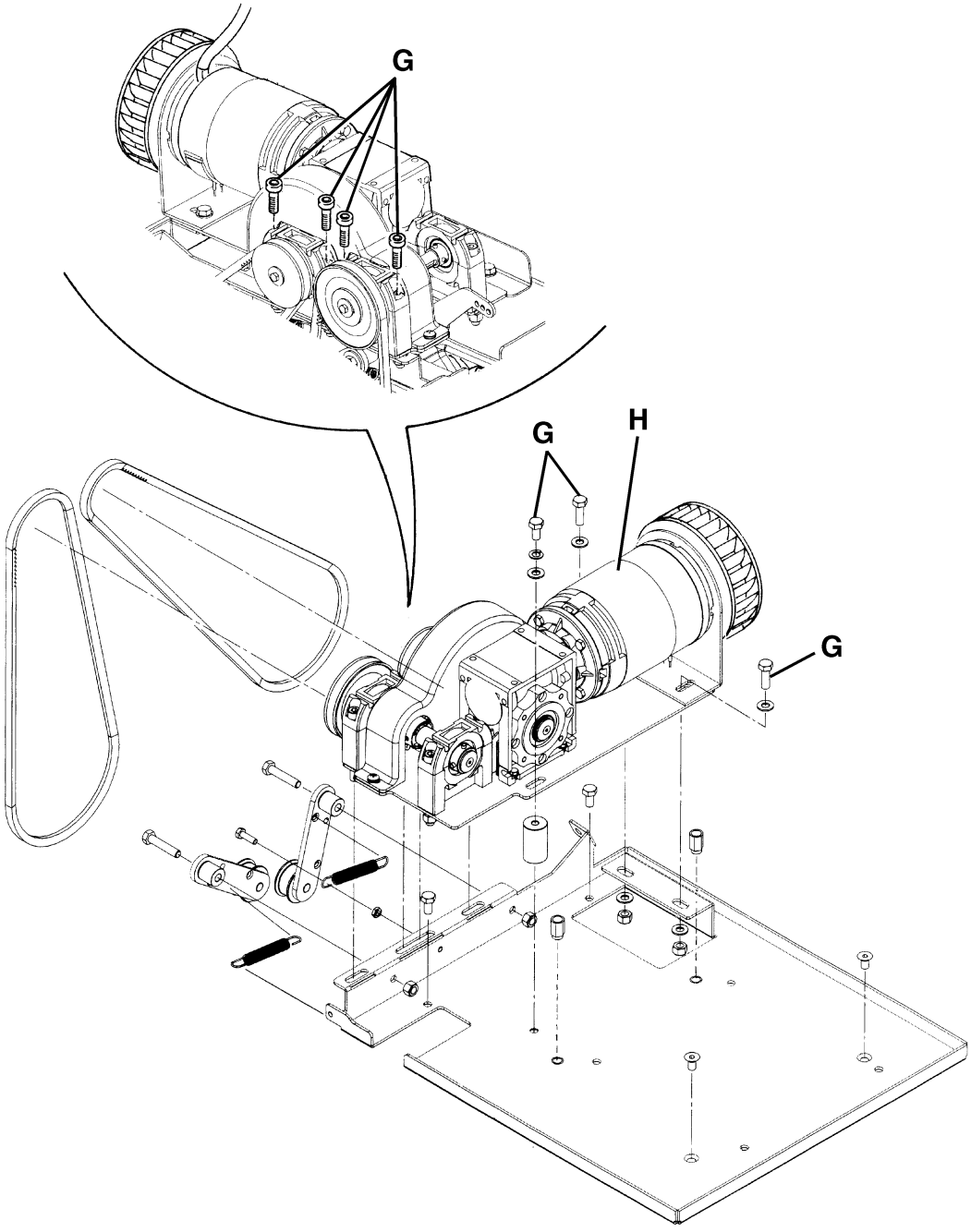


S300373

SWEEPING SYSTEM

MAIN BRUSH AND REDUCTION UNIT REPLACEMENT (Continues)

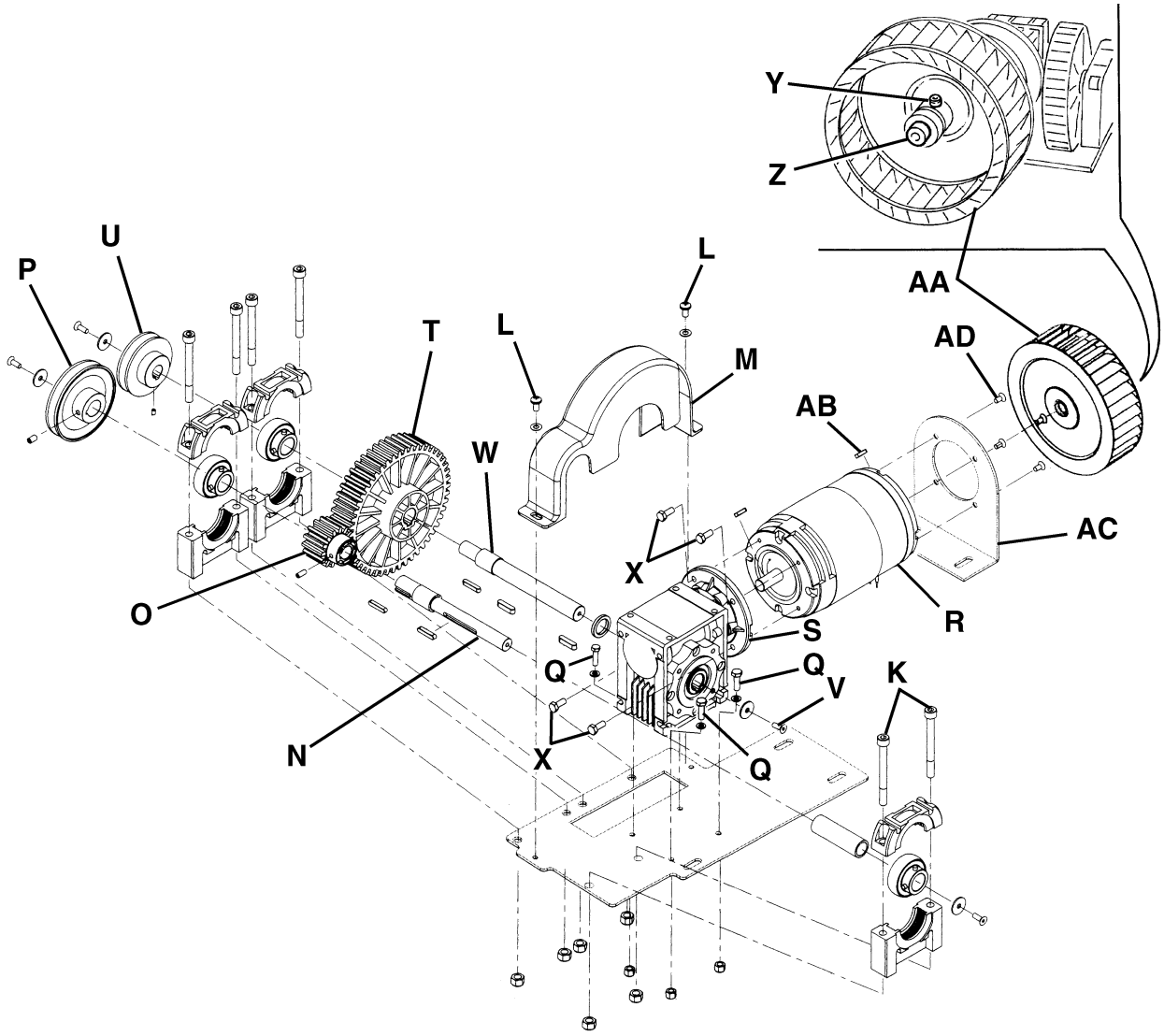
Figure 15



S300374

MAIN BRUSH AND REDUCTION UNIT REPLACEMENT (Continues)

Figure 16



S300375

SWEEPING SYSTEM

SIDE BRUSH MOTOR ELECTRICAL INPUT CHECK

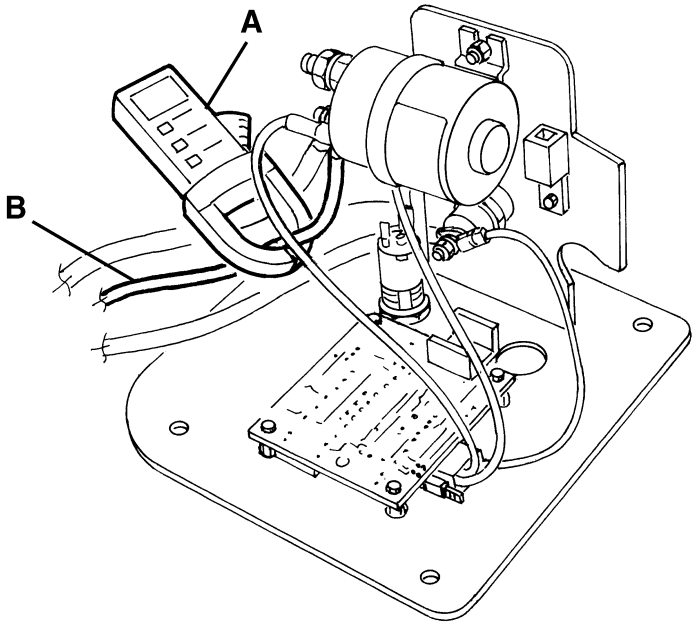
WARNING!
This procedure must be performed by qualified personnel only.

1. Remove the side brush (see the procedure in the related paragraph).
2. Remove the screws (9) and lift the control panel (1).

WARNING!
Carry out the following operation with extreme care.

3. Turn the ignition key (2) to "I" position, without pulling the selector lever (13).
4. With an ammeter (A) on the (gray) cable (B), connecting the motor to the electromagnetic switch, check that the motor electrical input is approximately 3 A at 12 V.
   If the electrical input is higher, it is necessary to replace the motor (see the procedure on the following page).
5. Carry out steps from 1. to 3. in the reverse order.

Figure 17



S300244

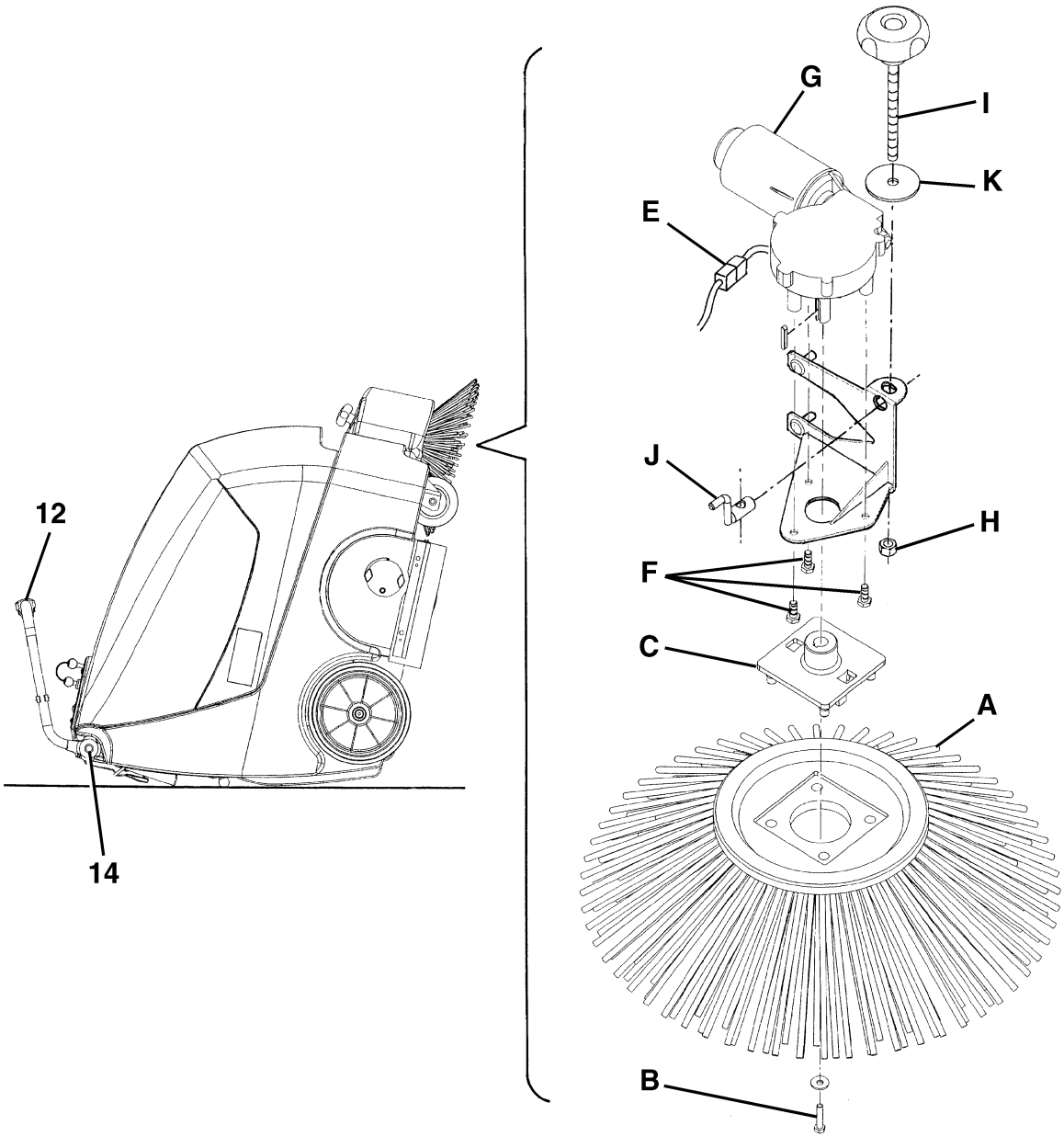
SIDE BRUSH MOTOR REPLACEMENT

1. Remove the battery (37) and the related holder.

WARNING!
If you do not remove the batteries before inclining the machine, serious damages to people or the machine can occur.

2. Operating on the handles (14), lower the handlebar (12) as shown in the figure below, then carefully lower the machine at the back (as shown in the figure below).
3. Remove the side brush (A).
4. Remove the screw (B).
5. Remove the hub (C) and recover the key (D).
6. Remove the nut (H) and the adjusting knob (I), and recover the retaining bolt (J) and the washer (K).
7. Disconnect the electrical connector (E).
8. Remove the screws (F).
9. Remove the side brush motor (G).
10. Install in the reverse order of removal.
11. Carry out the side brush height adjustment as described in the previous paragraph.

Figure 18



S300245

SWEEPING SYSTEM

TROUBLESHOOTING

THE MACHINE DOES NOT START with the key (2) to "I" position (the control panel does not activate).

Possible cause:
1. The battery connector (38) is not correctly connected (connect it)
2. The hood (16) is not correctly closed (close it)
3. The battery is discharged (charge it)
4. Possible disconnection of an electrical cable under the control panel (1) (disconnect the battery and connect the cable)
5. For machines with battery charger, the connections must be as follows:
   – Red cable: to battery positive terminal (+)
   – Black cable: to battery negative terminal (-)
   – Brown cable (of signal): to connector (54)
6. The key fuse (57) or the main fuse (41) are burned (replace them)

THE CONTROL PANEL ACTIVATES BUT THE MOTORS DO NOT START

Possible cause:
1. Electromagnetic switch malfunction (replace it)
2. For machines with filter-shaker, filter-shaker relay malfunction (replace it)

THE MAIN BRUSH DOES NOT ROTATE

Possible cause:
1. Dust or foreign materials hinder the operation of the main brush traction system (remove them)
2. The electric motor brushes are worn (replace them).
3. The electric motor has a malfunction (repair or replace it).
4. Drive belt from the electric motor broken (replace the belt).
5. The wiring harness is damaged (repair it).
6. The belt tensioner is malfunctioning (repair it).
7. The coupling or reduction unit are broken (repair or replace them).

THE SIDE BRUSH DOES NOT ROTATE

Possible cause:
1. Dust or foreign materials between the brush and the motor (remove them)
2. Malfunction in the electrical motor (repair or replace the electrical motor).
3. The fuse (42) is burned (replace it)
4. The wiring harness is damaged (repair it).

THE ELECTRIC MOTOR ROTATES EVEN IF THE KEY IS TO "0" POSITION

Possible cause:
1. Electromagnetic switch malfunction (replace it)

WARNING!
In this case, proceed very carefully when you disconnect the battery by the connector (38), because the hood safety device is not working.

FLAP HEIGHT AND OPERATION CHECK (AND ADJUSTMENT)

1. Drive the machine on a level and adequate ground to check the flap height.
2. Activate the pedal brake (36), if present.
3. Turn the ignition key (2) to “0” position.

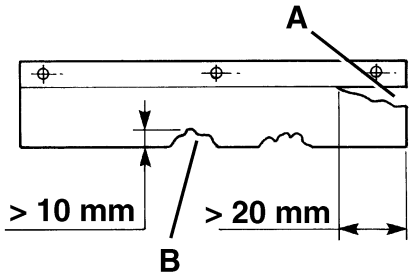
Side flap check

4. Check the side flap (23 and 24) integrity.
   Replace the flaps when they have cuts (A) larger than 20 mm or cracks (B) larger than 10 mm (see the “Service Manual” for Flap Replacement).
5. Check that side flap (C) height from ground is within 0 – 3 mm. (As shown) If necessary adjust the flap height, proceeding as follows:
   – **Left flap (23)**: Open the hood (16). Loosen the knob (D) and remove the brush left cover (E) by pulling outward to disengage the retainers (F).
     Adjust the flap (G) height using its slots (H).
     Install in the reverse order of removal.
   – **Right flap (24)**: Remove the main brush, as described in the related paragraph.
     Remove the belt (47) from the pulley (49). To facilitate the operation, rotate the pulley (49) by manually operating on the fan (51).
     Remove the screws (35) and the right cover (34) together with the belt (47).
     On the machine, adjust the flap (I) height using its slots (L).
     Install in the reverse order of removal.

Front and rear flap check

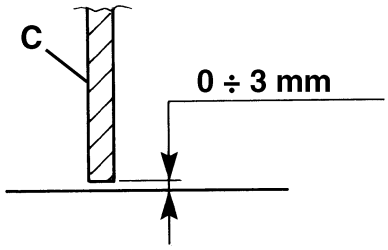
6. Remove the main brush, as described in the related paragraph.
7. Check the front (M) and rear (N) flap integrity.
8. Replace the flaps when they have cuts (A) larger than 20 mm or cracks (B) larger than 10 mm (see the “Service Manual” for Flap Replacement).
9. Check that:
   – The front flap (O) lightly touches the ground and that, however, it is not detached from ground (as shown in the figure).
   – The rear flap (C) height from ground is within 0 - 3 mm. (As shown)
     If necessary, adjust the flap height using its slots (P).
10. (Only for Terra 132B) Activate the front flap lifting lever (55) and check that the front flap (Q) rotates upward of 90° (as shown in figure); release the lever and check that the flap returns to the initial position and does not stay in an intermediate one. If necessary, refer to the following pages for the adjustment or replacement of front flap control cable.
11. Install in the reverse order of removal.

Figure 1



S300246

Figure 2

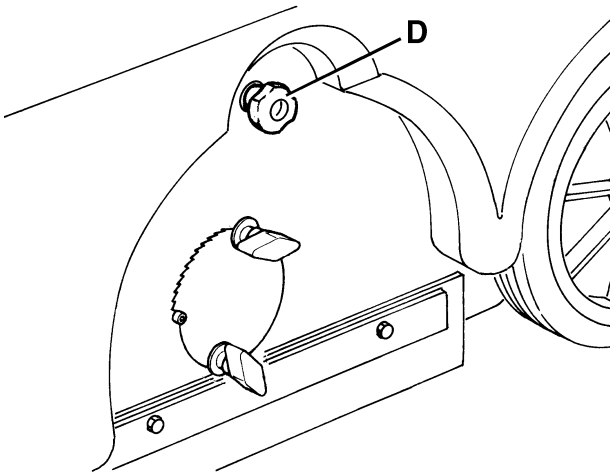


S300247

FLAP

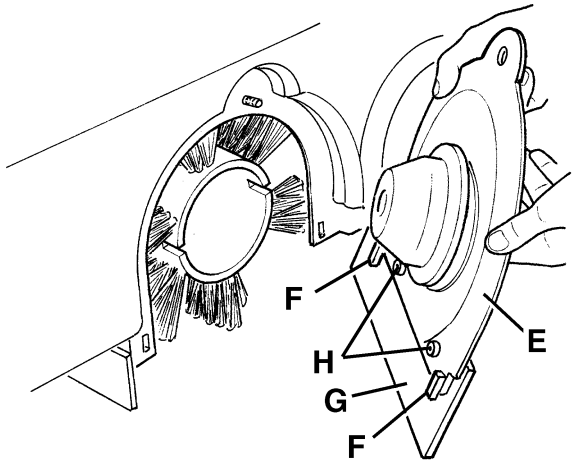
FLAP HEIGHT AND OPERATION CHECK (AND ADJUSTMENT) (continues)

Figure 3



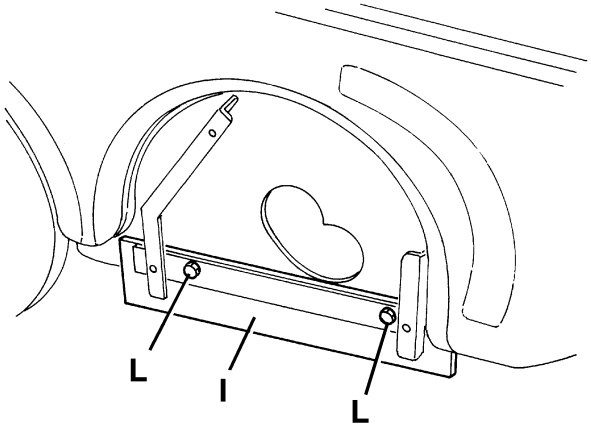
S300248

Figure 4



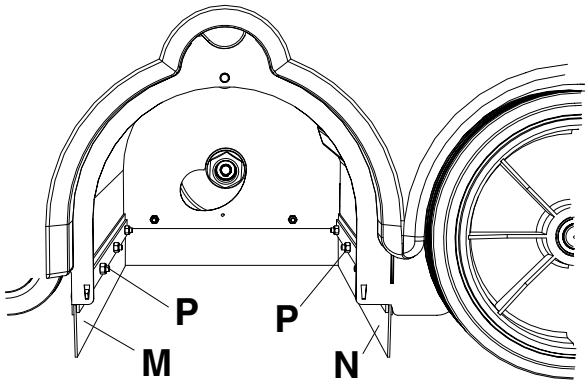
S300249

Figure 5



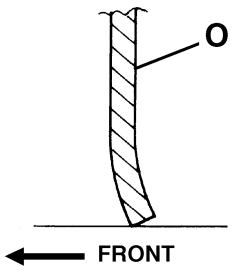
S300250

Figure 6



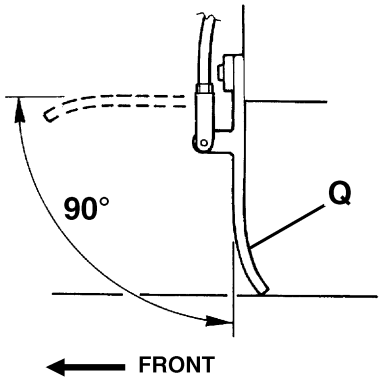
S300251

Figure 7



S300376

Figure 8



S300377

SIDE FLAP REPLACEMENT

1. Drive the machine on a level and adequate ground to check the flap height.
2. Activate the pedal brake (36), if present.
3. Turn the ignition key (2) to “0” position.

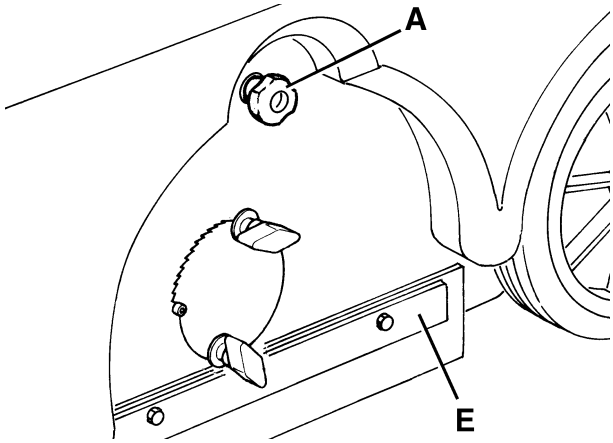
Left flap

4. Loosen the knob (A) and remove the brush left cover (B) by pulling outward to disengage the retainers (C).
5. Remove the screws (D) the straps (E) and the rear flap (F).
6. Reinstall the new rear flap (F) with the straps (E) and the screws (D).
7. Adjust the side flap height as described on the previous page.
8. Install in the reverse order of removal.

Right flap

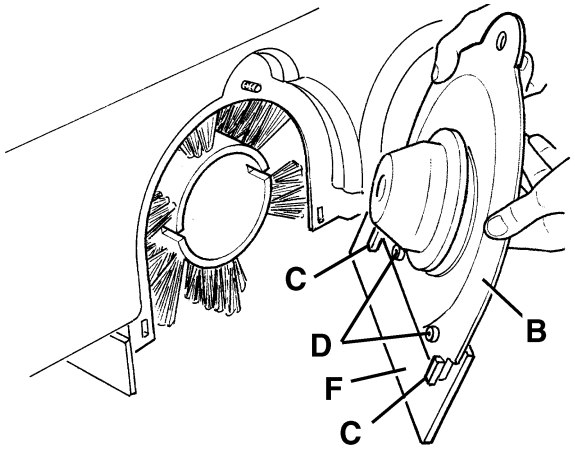
9. Remove the main brush, as described in the related paragraph.
10. Remove the belt (47) from the pulley (49). To facilitate the operation, rotate the pulley (49) by manually operating on the fan (51).
11. Remove the screws (35) and the right cover (34) together with the belt (47).
12. Remove the screws (G), the straps (H) and the rear flap (I).
13. Reinstall the new flap (I) with the straps (H) and the screws (G).
14. Adjust the side flap height as described on the previous page.
15. Install in the reverse order of removal.

Figure 9



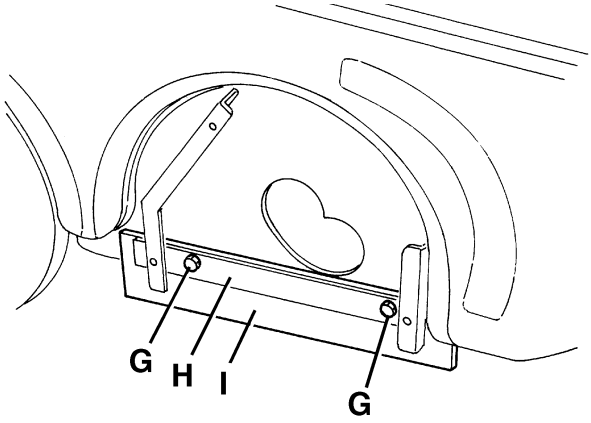
S300253

Figure 10



S300254

Figure 11



S300255

FLAP

FRONT AND REAR FLAP REPLACEMENT

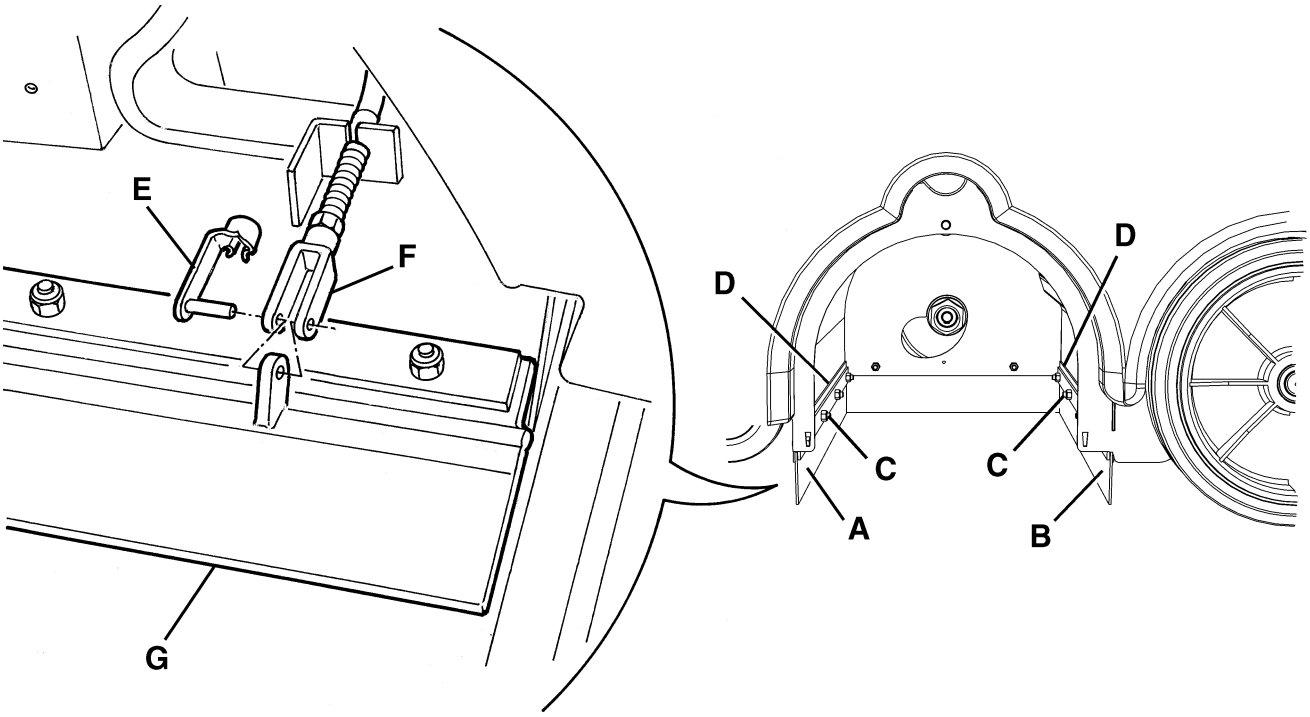
1. Drive the machine on a level and adequate ground to check the flap height.
2. Activate the pedal brake (36), if present.
3. Turn the ignition key (2) to “0” position.
4. Remove the main brush, as described in the related paragraph.
5. (Only for Terra 132B) Lightly lift the front side of the machine.

WARNING!
When lead batteries (WET) are installed on this machine, do not tilt the machine more than 30° from its horizontal position to not allow the highly corrosive acid to leak out of the batteries.

Remove the clip (E) and disconnect the lifting cable terminal (F) from the front flap (G).

6. Remove the screws (C) and the strap (D) and then remove the front flap (A) and/or the rear flap (B).
7. Reinstall the new flap (A and/or B) with the strap (D) and the screws (C).
8. Adjust the flap height as described on the previous page.
9. Install in the reverse order of removal.
10. (Only for Terra 132B) If necessary, refer to the following pages for the adjustment or replacement of front flap control cable.

Figure 12



S300378

FRONT FLAP LIFTING CABLE ADJUSTMENT (only for Terra 132B)

Correct adjustment check

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to "0" position.
3. Remove the main brush, as described in the related paragraph.
4. Activate the front flap lifting lever (55) and check that the front flap (A) rotates upward of 90° (as shown in figure); release the lever and check that the flap returns to the initial position and does not stay in an intermediate one.

Adjustment of the cable on the control lever

5. Loosen the ring nut (B) and turn the screw (C) as necessary to reach the condition indicate at step 4.; tighten the ring nut (B).
   If it is not possible to achieve a correct adjustment, perform the adjustment of the cable on the flap, according to the following procedure.

Adjustment of the cable on the flap

6. Remove the hopper (27).
7. Open the hood (16).
8. Remove the battery (37).

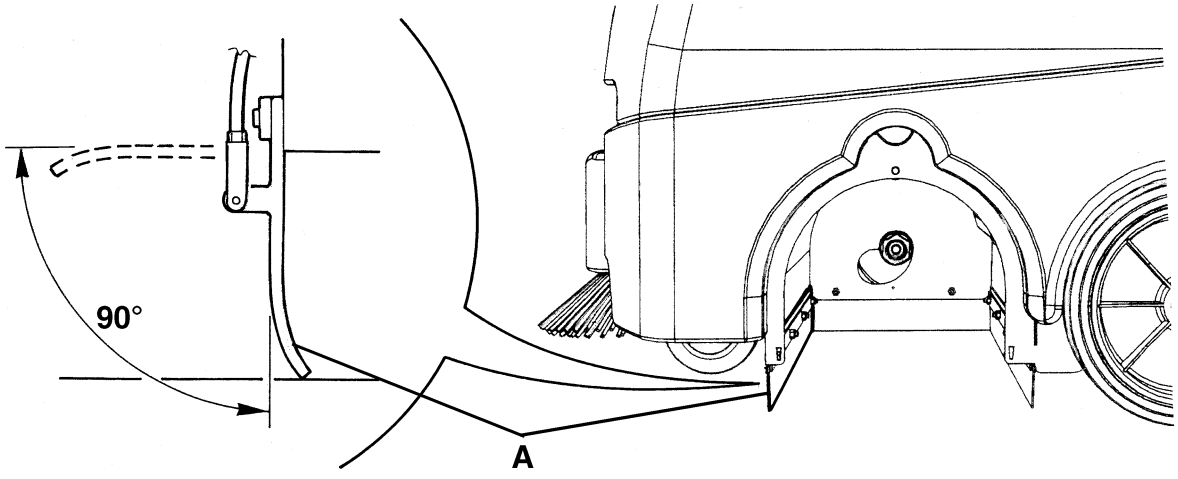
WARNING!
If you do not remove the batteries before inclining the machine, serious damages to people or the machine can occur.

9. Close the hood (16).
10. Operating on the handles (D), lower the handlebar (E) as shown in the figure, then carefully lower the rear side of the machine (as shown in the figure).
11. Remove the clip (F) and disconnect the lifting cable terminal (G) from the front flap (H).
12. Loosen the nut (I) and turn the terminal (G) as necessary; tighten the nut (I). Connect the lifting cable terminal (G) to the front flap (H), then install the clips (F).
13. Carry out step 4 again to check the correct adjustment.

Reassembly

14. Carry out steps from 3. to 6. and 10. in the reverse order.

Figure 13

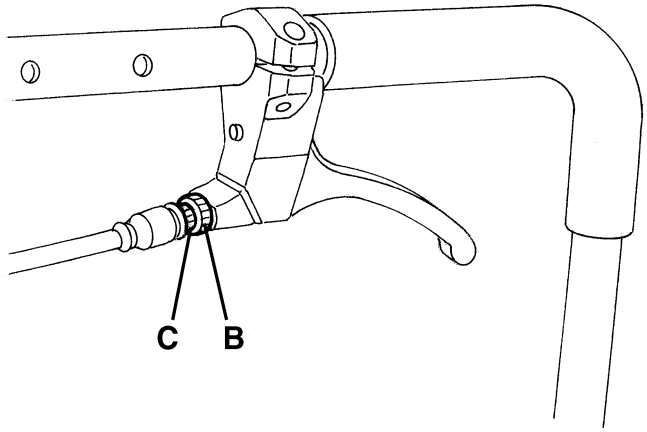


S300379

FLAP

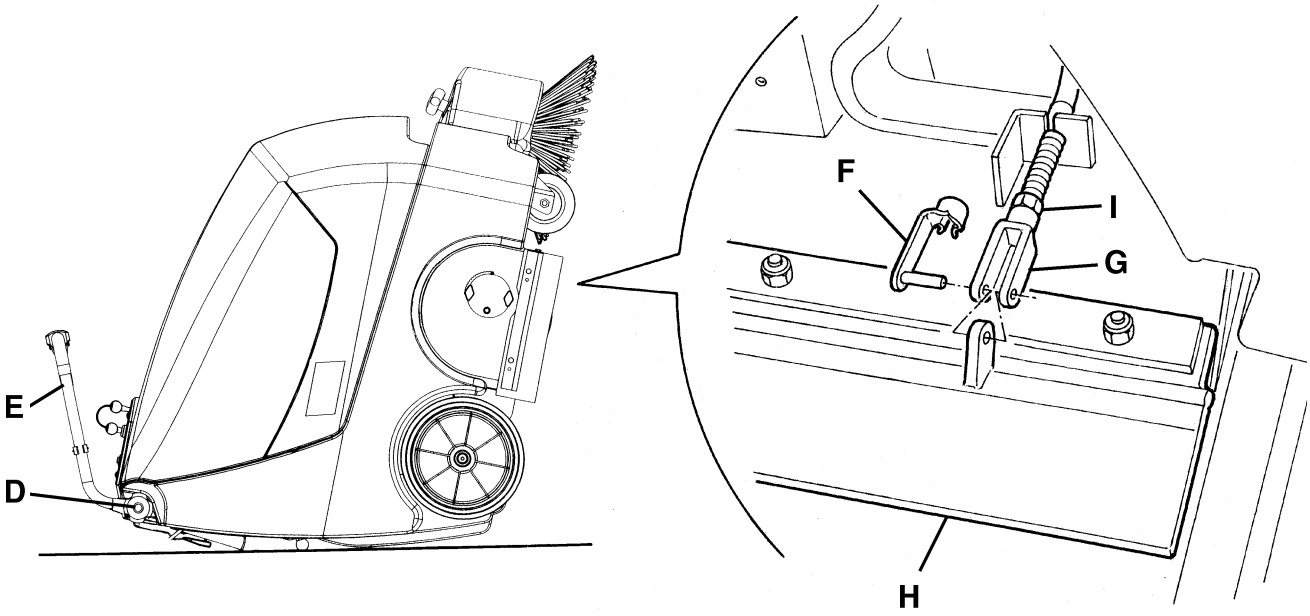
FRONT FLAP LIFTING CABLE ADJUSTMENT (only for Terra 132B) (continues)

Figure 14



S300380

Figure 15



S300381

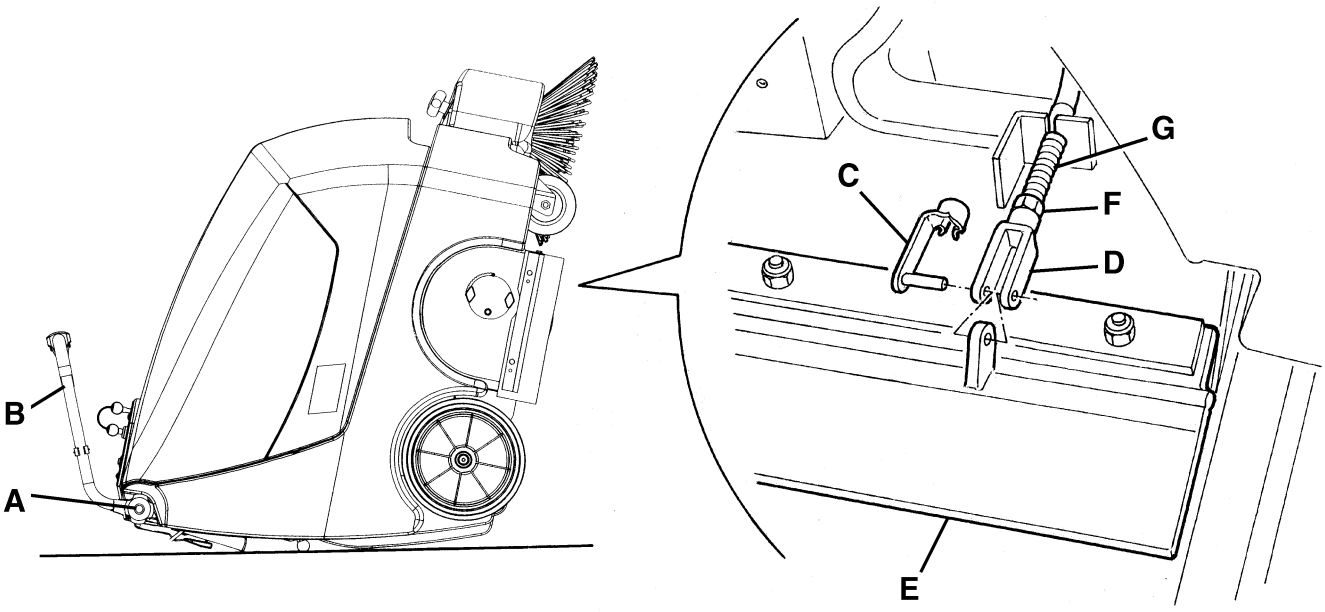
FRONT FLAP LIFTING CABLE REPLACEMENT (only for Terra 132B)

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to "0" position.
3. Remove the hopper (27).
4. Open the hood (16).
5. Remove the battery (37).

WARNING!
If you do not remove the batteries before inclining the machine, serious damages to people or the machine can occur.

6. Close the hood (16).
7. Operating on the handles (A), lower the handlebar (B) as shown in the figure, then carefully lower the rear side of the machine (as shown in the figure).
8. Remove the clip (C) and disconnect the lifting cable terminal (D) from the front flap (E).
9. Loosen the nut (F) and remove the terminal (D).
10. Remove the nut (F) and the spring (G).
11. Remove the screws (9) and lift the control panel (1), and then move it laterally.
12. Disengage the clip (H) from the cable.
13. Connect a probe (cord or equivalent) to the cable end (I) (this operation is necessary to facilitate the insertion of the cable inside the machine).
14. Remove the cable (L) from the machine and leave a probe in its place (to reinstall the cable later); when removing the cable, check through the opening (M) that the electrical cables and other machine parts are correctly routed.
15. Remove the flap-lifting lever fixing screws (N).
16. Remove the cable and the lever (O).
17. Carry out steps from 16. to 8. in the reverse order.
18. Adjust the front flap lifting cable, as described on the previous pages.
19. To reinstall, carry out steps from 7. to 1. in the reverse order.

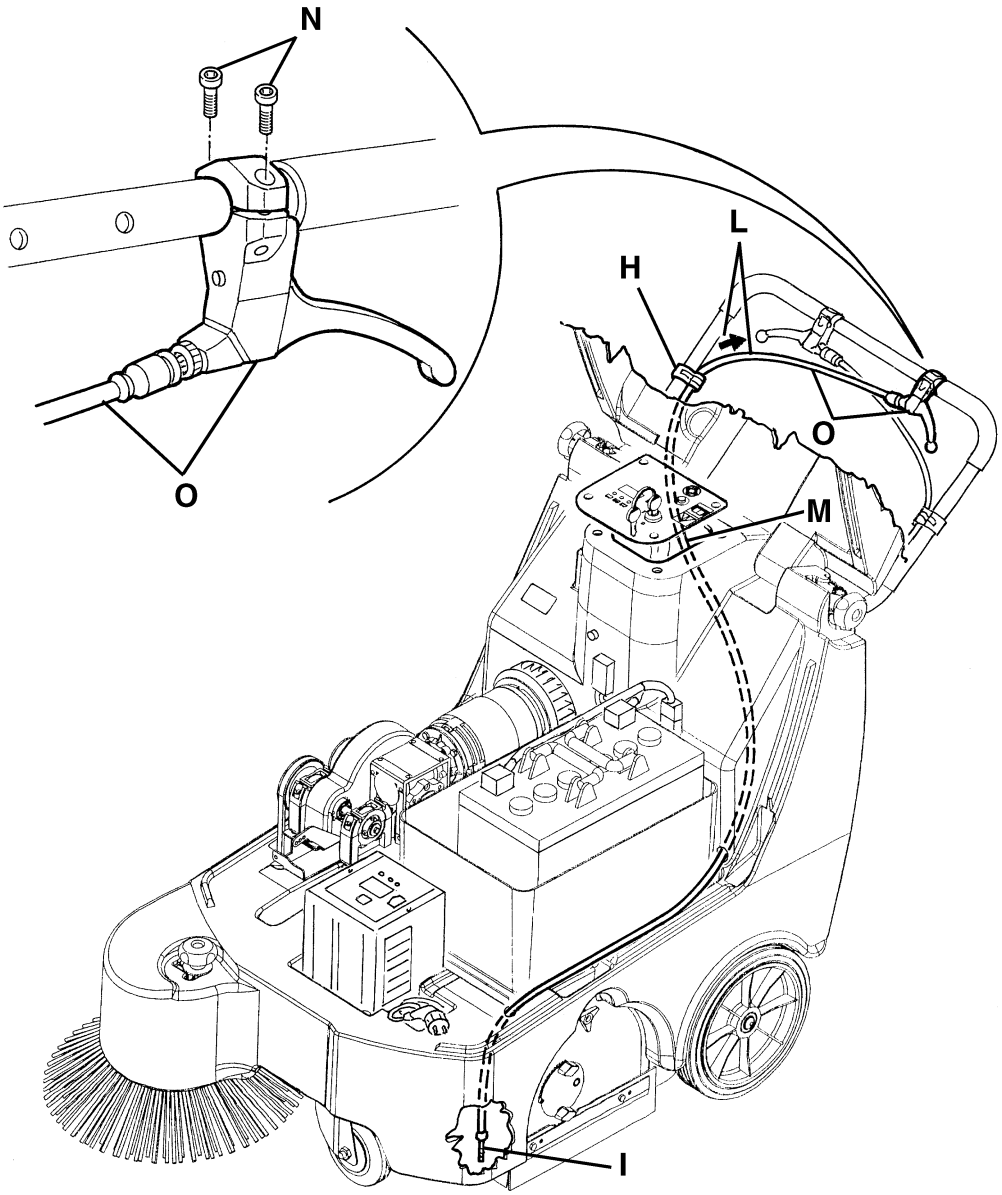
Figure 16



FLAP

FRONT FLAP LIFTING CABLE REPLACEMENT (only for Terra 132B) (continues)

Figure 17



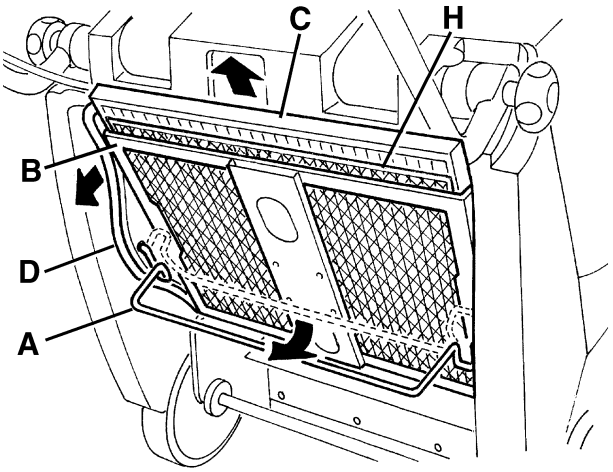
S300383

DUST FILTER CLEANING AND INTEGRITY CHECK

Remark: Besides the standard paper filter, optional polyester filters are also available. The following procedure is applicable to each type.

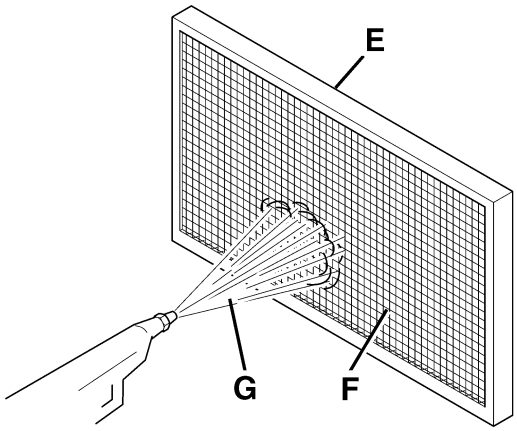
1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Disengage the retainer (28)
4. By means of the handle (29) pull out the hopper (17).
5. Turn the handle (A) upward (90° approximately) and let the filter frame (B) rotate outward.
6. Pull out the pre-filter (H) and the dust filter (C) upward.
7. Clean the pre-filter (H).
8. In an outdoor area, clean the filter shaking it on a level and clean surface, tapping the side (E), opposite to the wire gauze (F). Complete the cleaning by means of compressed air (G) of max. 6 bars (87 psi), blowing only from the side protected by the wire gauze (F).
   According to the filter type, take care of the following cautions:
   – Paper filter (standard), do not use water or detergents to clean it; the filter can be damaged
   – Polyester filter (optional): to clean it, see the above-mentioned instructions. For a better cleaning, it is allowed to wash the filter with water and non-frothing detergents. This type of washing, even if it is better for quality, reduces the life of the filter that must be replaced more frequently. The use of inadequate detergents can damage the filter.
   – Check the filter body for lacerations.
9. If necessary clean the filter compartment rubber seal (D) along its perimeter and check its integrity. If necessary, replace it.
10. Install in the reverse order of removal, with the following caution:
    – Reinstall the filter with the wire gauze (F) facing the front part of the machine.

Figure 1



S300415

Figure 2



S300258

DUST AND DEBRIS COLLECTION SYSTEM

FILTER-SHAKER OPERATION CHECK

1. While using the machine, when the panel filter is supposed to be full, activate the filter-shaker proceeding as follows, according to the type of filter-shaker installed:
   – Manual filter-shaker: Pull the handle (30) outward up to the end of stroke, then release it: the interior return spring strikes the dust filter frame and shakes it.
   Repeat this operation several times.
   – Electric filter-shaker (optional): press and hold the filter-shaker button (8) for a few seconds and check that the related sound is heard.
   – Restart machine operation and check if the filter has been shaken. If the filter has been shaken correctly, the machine intake capability is greatly improved.
2. If necessary, check and replace the filter-shaker installed.

FILTER-SHAKER MOTOR ELECTRICAL INPUT CHECK (optional)

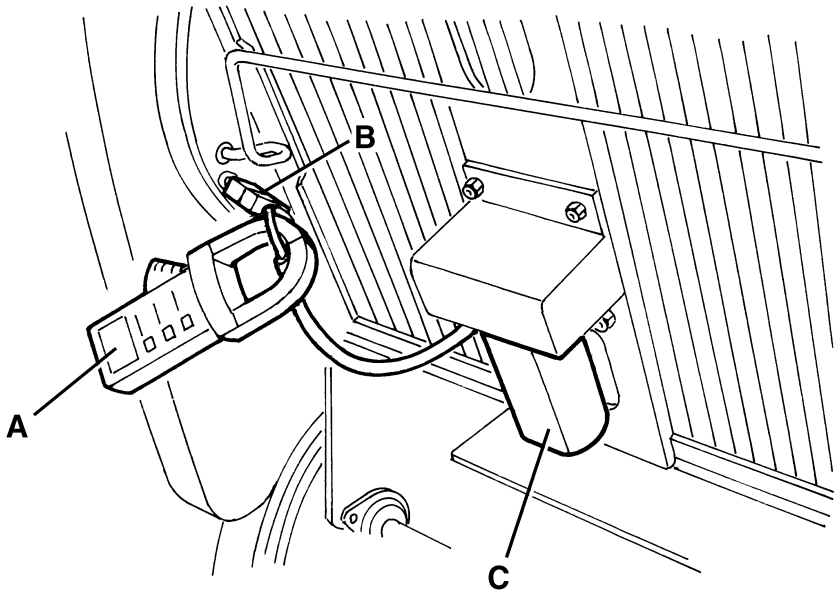
WARNING!
This procedure must be performed by qualified personnel only.

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Remove the hopper (27).
3. Lift the side brush by means of the handle (21).

WARNING!
Carry out the following operation with extreme care.

4. Turn the ignition key (2) to "I" position, without pulling the selector lever (13).
5. Activate the filter-shaker motor by means of the button (8) and, at the same time, by means of an ammeter (A) on the cable (B), check that the filter-shaker motor (C) electrical input is approximately 3 - 5 A at 12 V. If the electrical input is higher, it is necessary to replace the motor.
6. Carry out steps from 1. to 4. in the reverse order.

Figure 3



S300259

TROUBLESHOOTING

THE SUCTION SYSTEM (FAN) DOES NOT ROTATE

Possible cause:
1. The battery is discharged (charge the battery).
2. The electric motor brushes are worn (replace them).
3. Main electric motor failure (repair or replace it)
4. Foreign materials obstruct the fan (remove them).
5. The wiring harness is damaged (repair it).
6. The fan is no more connected to the shaft (fixit it again)

THE FILTER-SHAKER MOTOR (optional) DOES NOT OPERATES

Possible cause:
1. Electric motor failure (repair or replace it)
2. The filter-shaker button (16) is broken (replace it)
3. Filter-shaker relay failure (replace it)
4. The wiring harness is damaged (repair it).
5. Dust accumulation in the filter-shaker motor vibrating mass case (disassemble the filter-shaker and clean it)
6. Filer-shaker motor overheating (let the filter-shaker motor cool down and try again).

TRACTION SYSTEM

DRIVING BELT VISUAL INSPECTION

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Open the hood (16).
4. Visually inspect the driving belt (48) condition. Check the belt completely by turning it manually one full turn.
5. If the belt is worn, replace it according to the procedure indicated in the related paragraph.
6. Carry out steps from 1. to 3. in the reverse order.

DRIVING BELT TENSOR ADJUSTMENT

Correct adjustment check

1. Check the tensor correct adjustment, operating according to the procedure below:
   – Turn the ignition key (2) to “I” position.
   – Pull carefully the selector lever (A) and check that at the first half of the stroke (B) the machine stands still; then check that at the beginning of the second half of the stroke (C) the machine starts to move, until it reaches the maximum speed at the end of the second half of the stroke.

If the lever operation is not correct, perform the adjustment of the cable on the lever and if necessary, on the tensor, according to the following procedure.

Adjustment of the cable on the lever

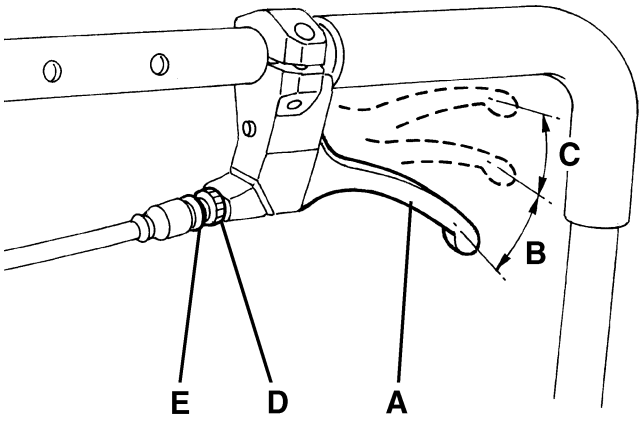
2. Turn the ignition key (2) to “0” position.
3. Loosen the ring nut (D) and turn the screw (E); tighten the ring nut (D).
4. Carry out step 1 again to check the correct adjustment.

If a correct adjustment is not possible, perform the adjustment of the cable on the tensor, according to the following procedure.

Adjustment of the cable on the tensor

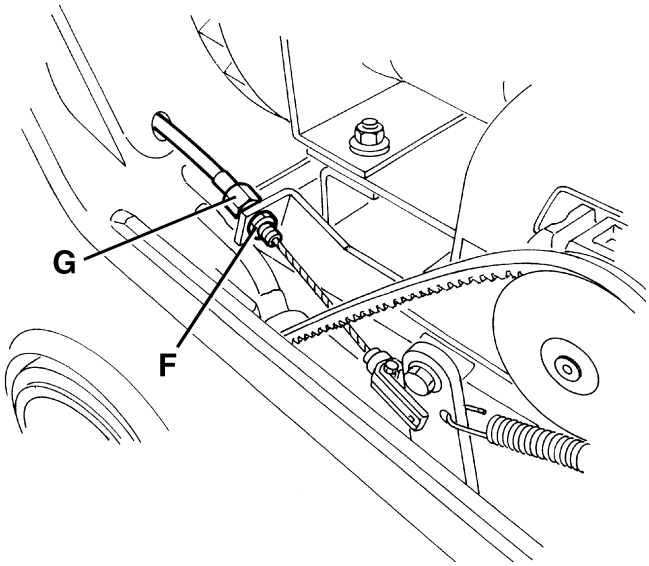
5. Turn the ignition key (2) to “0” position.
6. Open the hood (16).
7. Loosen the nut (F) and turn the screw (G); tighten the nut (F).
8. Carry out step 1 again to check the correct adjustment.

Figure 1



S300260

Figure 2

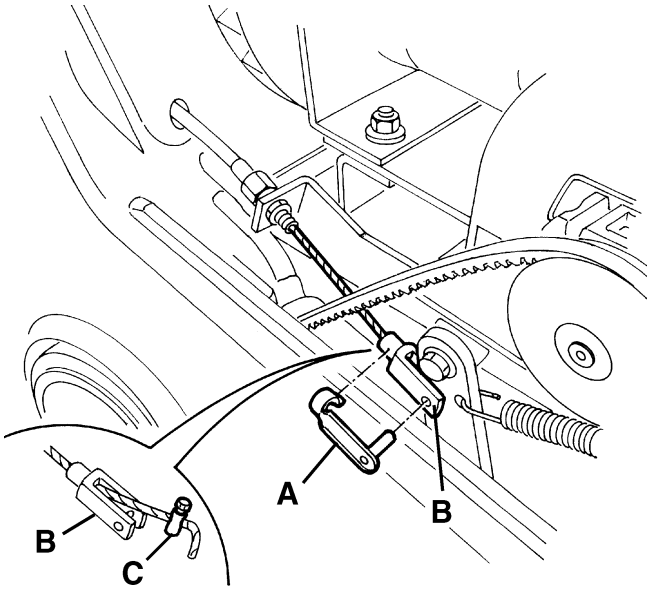


S300261

DRIVING BELT CONTROL CABLE REPLACEMENT

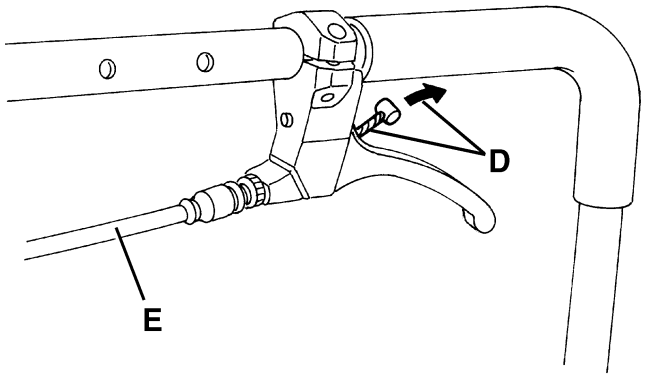
1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Open the hood (16).
4. Remove the clip (A) and move the fork (B) of the driving belt control cable.
5. Unscrew the terminal (C) and remove it.
6. Pull out the cable (D) by pulling it from the side of the selector lever.
   If necessary, remove the sheath (E) (see the procedure on the following page).
7. Install in the reverse order of removal, with the following caution:
   – Do not lubricate the new control cable, as the cable exterior surface is already coated to facilitate the correct sliding of the sheath (Teflon).
8. Adjust the driving belt tensor (see the procedure on the previous page).

Figure 3



S300262

Figure 4



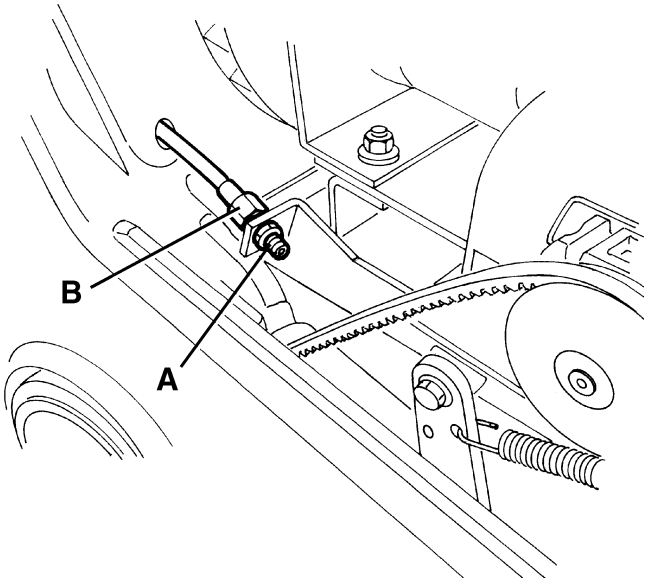
S300263

TRACTION SYSTEM

DRIVING BELT CONTROL CABLE SHEATH REPLACEMENT

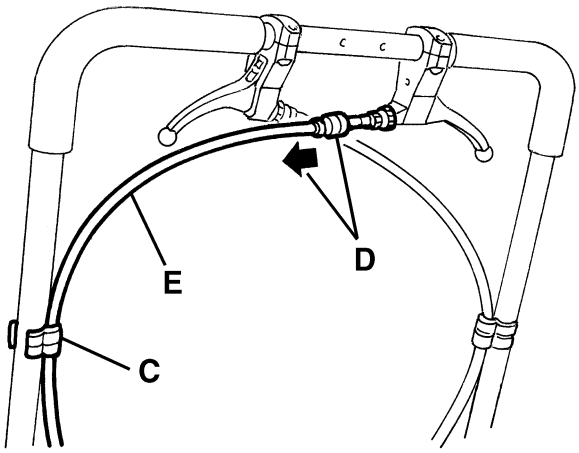
1. Remove the driving belt control cable (see the procedure on the previous page).
2. Turn the ignition key (2) to “0” position.
3. Open the hood (16).
4. Unscrew the nut (A) fixing the sheath on the tensor side.
5. Connect a probe (cord or equivalent) to the sheath end (B) (this operation is necessary to facilitate the insertion of the sheath inside the carter).
6. Disengage the clip (C) from the sheath.
7. Move away the guard (D).
8. Remove the sheath by pulling it out of the plastic frame and leaving the probe in place of the sheath (for the subsequent sheath reinstallation).
9. Install in the reverse order of removal, with the following change:
   – When inserting the sheath by means of the probe, if it is necessary to check its correct routing, remove the screws (9) and lift the control panel (1) after having disconnected the battery electrical connector (38).

Figure 5



S300264

Figure 6

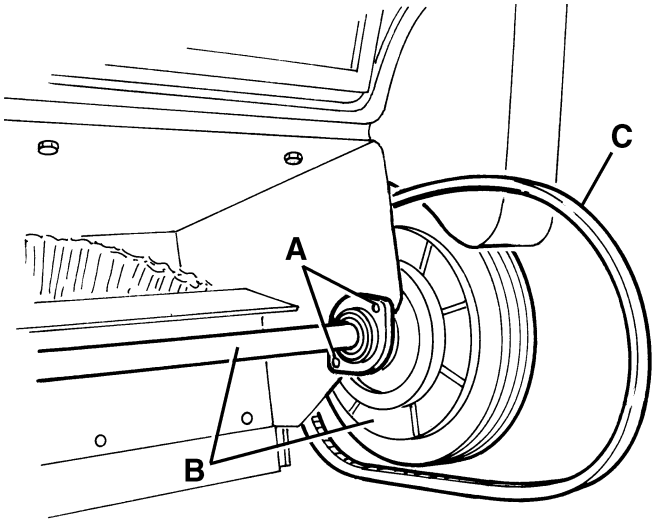


S300384

DRIVING BELT REPLACEMENT

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Remove the hopper (27).
4. Open the hood (16).
5. Remove the belt (48) from the pulley (50).
6. Remove the screws (A) fixing the axle to the frame, on machine both sides.
7. Lightly lift the machine and detach the axle with the wheels (B).
8. Recover the driving belt (C).
9. Install in the reverse order of removal.

Figure 7



S300266

TRACTION SYSTEM

DRIVING WHEEL OR AXLE BEARING REPLACEMENT

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Remove the hopper (27).
4. Open the hood (16).
5. Remove the belt (48) from the pulley (50).
6. Remove the screws (M) fixing the axle to the frame, on machine both sides.
7. Lightly lift the machine and detach the axle with the wheels (N).
8. Recover the driving belt (O).
9. At the cabinet bench, remove the screw (A) of the relevant wheel.

Driving wheel disassembly

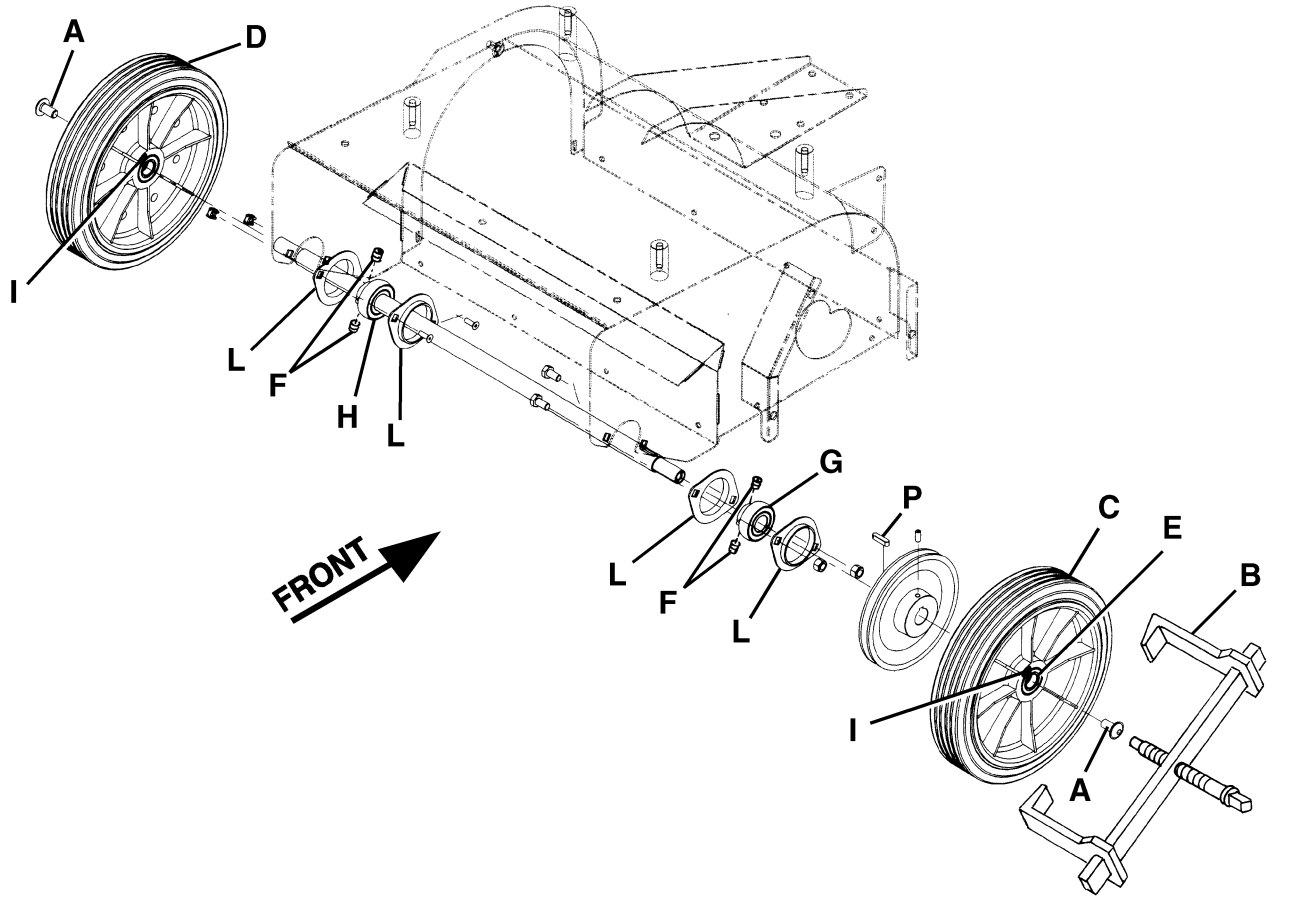
10. By means of a puller (B), remove the right or left driving wheel (C or D), after having inserted a protection washer in the threaded hole (E). (The wheel is connected to the shaft by means of a lightly forced parallel coupling).
    Recover the key (P).
    The right wheel (C) is not identical to the left wheel (D) and it has a blue stamp on the internal side.
    Both wheels have a red mark (I) that must be on the external part of the axle for the right wheel (C) and on the internal part of the axle for the left wheel (D) (as shown in the figure).

Axle bearing disassembly

11. Disassemble the left driving wheel (D) and then unscrew the threaded dowels (F) and pull out the axle bearings (G and H), recovering the flanges (L).
12. Install in the reverse order of removal, with the following change:
    – Wheel (C and D) installation on the shaft, can be performed by means of a mallet.
    – If the bearings (G and H) have been disassembled, their installation with dowels (F), must be performed when installing the axle assembly on the machine frame by means of the flanges (L) to center the axle on the frame.

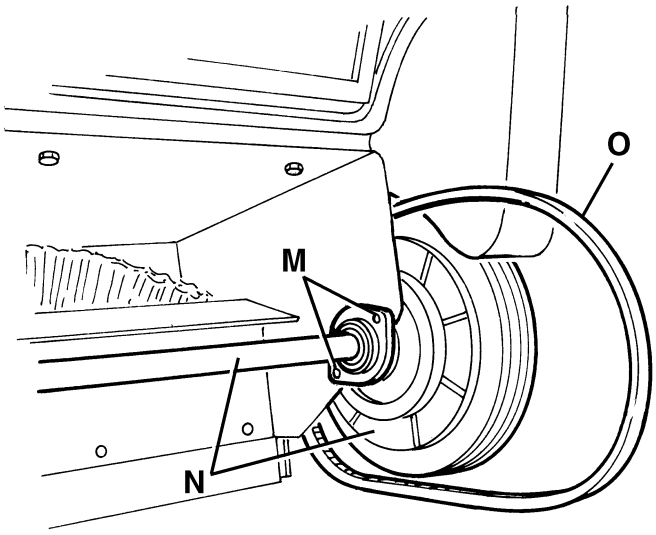
DRIVING WHEEL OR AXLE BEARING REPLACEMENT (continues)

Figure 8



S300267

Figure 9



S300268

TRACTION SYSTEM

TROUBLESHOOTING

THE MACHINE DOES NOT MOVE

Possible cause:

1. Dust or foreign materials rolled up between the transmission elements (remove them)
2. The selector lever control cable is misadjusted or broken (adjust/replace it)
3. The driving belt (48) is broken (replace it)
4. The brake (36) is activated (deactivate it).
5. The wheel bearings do not set on the traction shaft (adjust them by means of the related dowel pins).

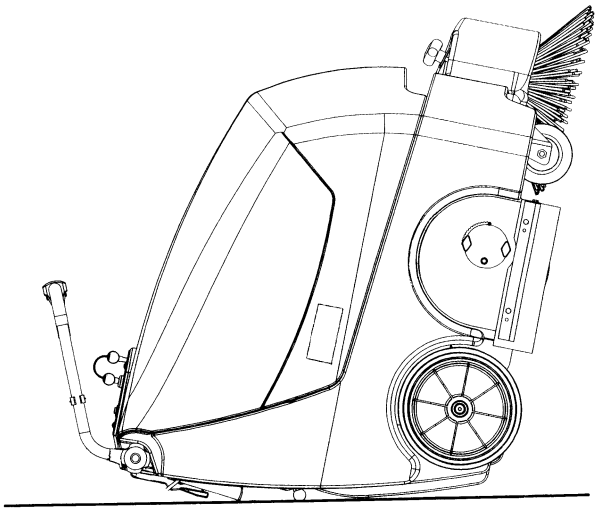
SCREW AND NUT TIGHTENING CHECK

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Remove the hopper (27).
4. Open the hood (16).
5. Remove the battery (37).

WARNING!
If you do not remove the batteries before inclining the machine, serious damages to people or the machine can occur.

6. Carry out the following checks:
   – Accessible fixing screw and nut tightening
   – Other fixing element proper position
   – Other component and item visible faults.
7. Close the hood (16).
8. Operating on the handles (14), lower the handlebar (12) as shown in the figure below, then carefully lower the machine at the back (as shown in the figure below).
9. Under the frame, check the following:
   – Accessible fixing screw and nut tightening
   – Other fixing element proper position
   – Other component and item visible faults.
10. Carry out steps from 1. to 5. and 8. in the reverse order.

Figure 1



S300269

ELECTRICAL SYSTEM

BATTERY MAINTENANCE AND RECHARGING

See Use and Maintenance Manual

BATTERY INSTALLATION AND BATTERY TYPE SETTING (WET OR GEL)

Battery type selection

1. The machine can be equipped with the following types of batteries:
   – Lead battery, with acid electrolyte
   – Gel battery, hermetic
2. To identify battery voltage and capacity, see chapter Technical Data.
3. To assemble the battery on the machine, see the diagram (45).

Battery removal

4. Drive the machine on a level ground and activate the pedal brake (36), if present.
5. Turn the ignition key (2) to “0” position.
6. Open the hood (16).
7. Disconnect the battery electrical connector (38).
8. Remove the battery (37).

New battery installation

9. According to the battery type selected (lead or gel), before connecting the battery to the machine electrical system, the machine electronic board and the battery charger (if installed on the machine) must be set, performing the following operations:

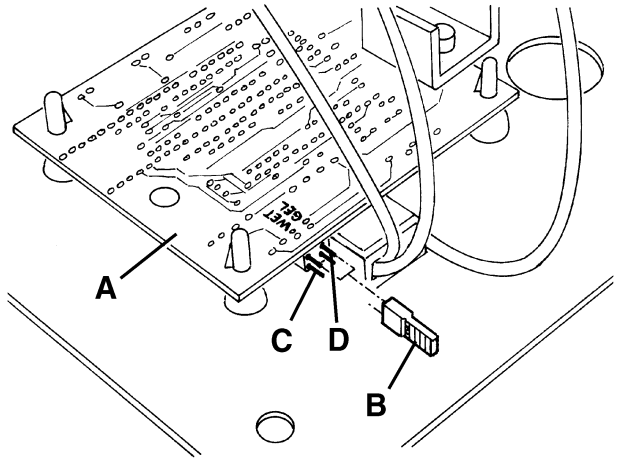
Machine electronic board setting

10. Remove the screws (9) and carefully pull out the control panel (1).
11. Operating on the electronic board, install a jumper wire (A) on the “WET” connectors (C) for lead battery or on the “GEL” connectors (D) for gel battery.
12. Reinstall the control panel (1) and tighten the screws (9).

Battery charger setting

13. Take the battery charger selector (44) to (WET) for lead battery, or to (GEL) for gel battery.
14. Install the battery on the machine according to the diagram (45) and connect the electrical cables.
15. Connect the battery electrical connector (38).
16. Charge the battery (see the procedure in the Use and Maintenance Manual).

Figure 1



S300270

FUSE REPLACEMENT

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Open the hood (16).
4. Disconnect the battery electrical connector (38).

60 A fuse (main fuse) replacement

5. Remove the guard (41) and pull out the underlying 60 A fuse.

15 A fuse (side brush motor fuse) replacement

6. Pull out the 15 A fuse (42).

10 A fuse replacement (Key-electronic board fuse)

7. Pull out the 10 A fuse (57).

Reset

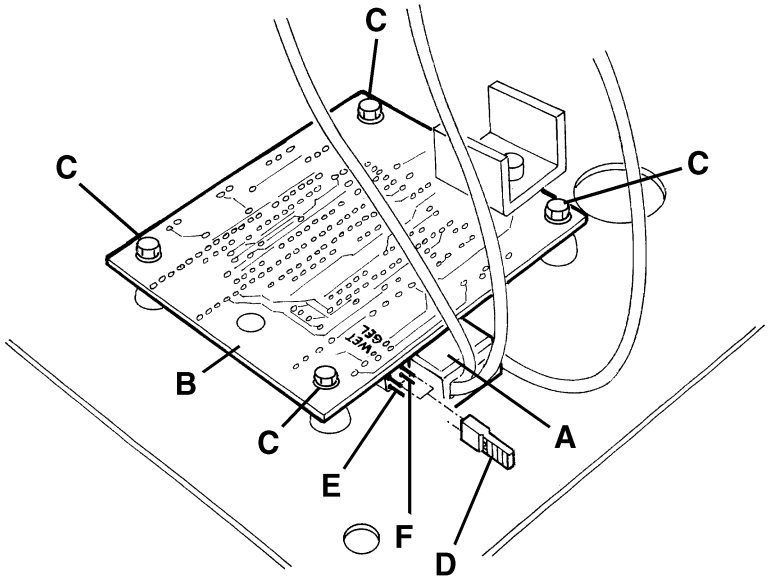
To reset the machine, install in the reverse order of removal.

ELECTRICAL SYSTEM

ELECTRONIC BOARD REPLACEMENT

1. Drive the machine on a level ground and activate the pedal brake (36), if present.
2. Turn the ignition key (2) to “0” position.
3. Open the hood (16).
4. Disconnect the battery electrical connector (38).
5. Remove the screws (9) and lift the control panel (1).
6. Disconnect the electrical connector (A).
7. Remove the electronic board (B) by disconnecting the screws (C).
8. Install in the reverse order of removal, with the following change:
   – The new electronic board must be aligned (set) to the battery type (37) installed on the machine, according to the following procedure:
   – Install a jumper wire (D) on the “WET” connectors (E) for lead battery, or on the “GEL” connectors (F) for gel battery.

Figure 2



S300272

HOOD SAFETY SWITCH OPERATION CHECK

1. With the machine off, open the hood (16).
2. Try to start the machine by turning the ignition key (2) to "I" position and check that it is not possible to start the machine.
3. Close the hood (16).
4. Start the machine by turning the ignition key (2) to "I" position.
5. Open the hood (16) and check that the machine turns off immediately.
6. Turn the ignition key (2) to "O" position.
7. Close the hood (16).

CHECK IF THE MACHINE DOES NOT START WHEN THE (OPTIONAL) BATTERY CHARGER PLUG IS CONNECTED TO THE NET OUTLET

1. With the machine off, insert the battery charger electrical cable plug (40) in the electrical net outlet.
2. Try to start the machine by turning the ignition key (2) to "I" position and check that it is not possible to start the machine.
3. Disconnect the electrical cable plug (40) from the net.

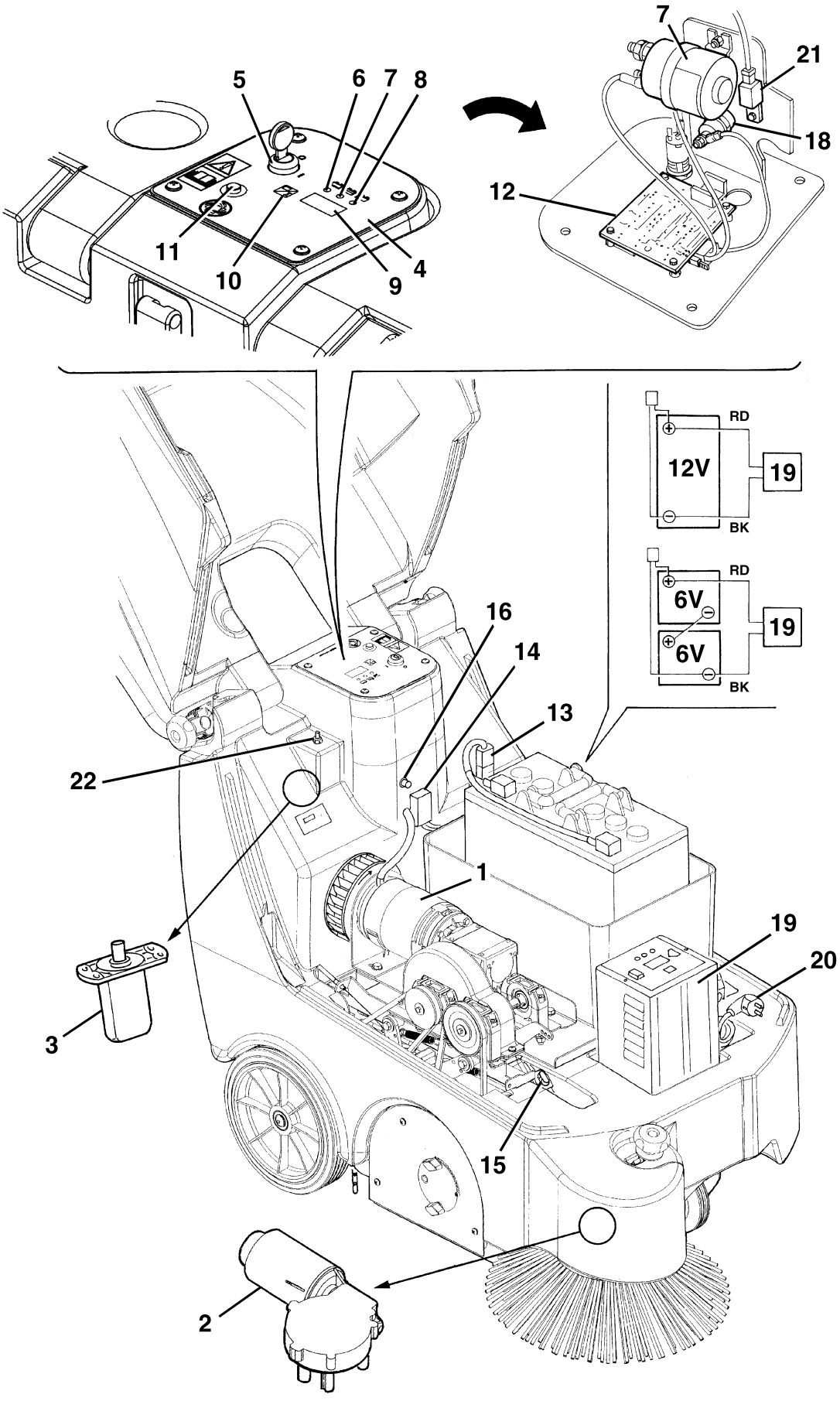
ELECTRICAL SYSTEM

COMPONENT LAYOUT

Remark: The symbol in brackets (..) after the name of the component refers to the wiring diagram (see the following pages).

1. Main motor (M1)
2. Side brush motor (M2)
3. Filter-shaker motor (M3)
4. Control panel
5. Ignition switch (SW1)
6. Discharged battery warning light
7. Semi-discharged battery warning light
8. Charged battery warning light
9. Display
10. Display selection button: hour counter/ hour and minutes counter / battery voltage (V)
11. Filter-shaker button (optional) (SW3)
12. Electronic board (EB1)
13. Battery connector (CN1)
14. 60 A main fuse (F1)
15. 15 A side brush motor fuse (F2)
16. 10 A key fuse (F3)
17. Electromagnetic switch (ES1)
18. Insulator
19. Battery charger (CH1)
20. Battery charger connector (CN2)
21. Filter-shaker relay (R1)
22. Hood safety switch (SW2)

Figure 3


7
21
5
6
7
8
18
12
11
10
9
4
RD
12V
19
BK
RD
6V
19
6V
BK
16
14
13
22
1
19
20
3
15
2
S300385

ELECTRICAL SYSTEM

WIRING DIAGRAMS

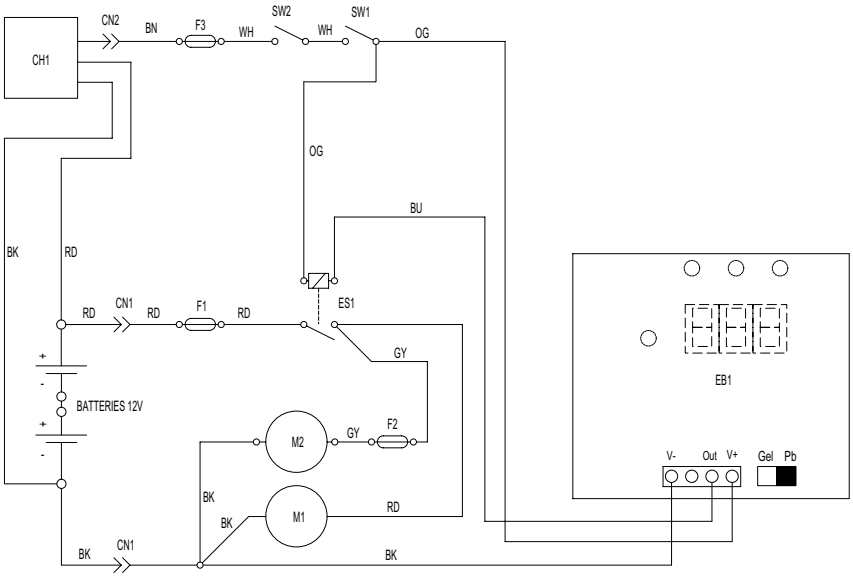
Wiring diagrams for optional equipments:
1. Standard
2. With filter-shaker

KEY

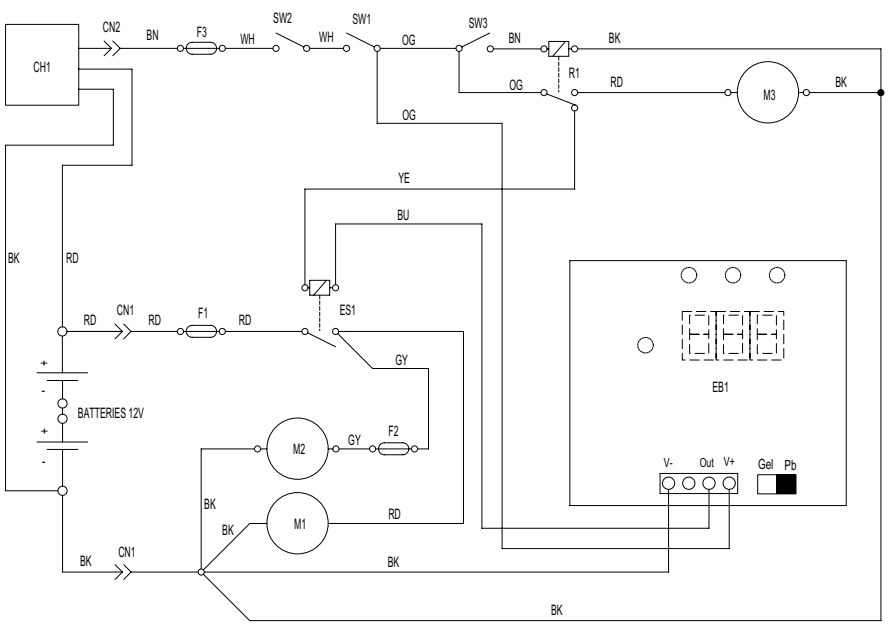
CH1 Battery charger
CN1 Battery connector
CN2 Battery charger connector
EB1 Electronic board
ES1 Electromagnetic switch
F1 Main fuse (60A)
F2 Side brush fuse (15A)
F3 Key fuse (10A)
M1 Main brush motor
M2 Side brush motor
M3 Filter-shaker motor
R1 Filter-shaker relay
SW1 Key switch
SW2 Hood safety switch
SW3 Filter-shaker switch

COLOR CODE

BK Black
BU Blue
BN Brown
GN Green
GY Grey
OG Orange
PK Pink
RD Red
VT Violet
WH White
YE Yellow



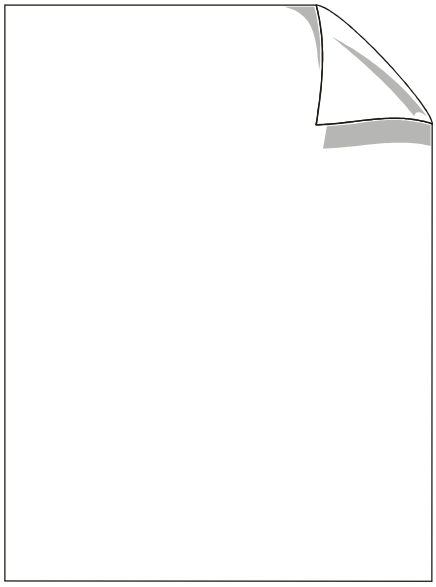
STANDARD



WITH SHAKER

S300416

ELECTRICAL SYSTEM



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